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Dissolved and Self-Generated Acetylene

Advantages and Disadvantages of the Ways of
Securing Acetylene for Welding, Etc.—How Pres-
sures Affect Economies and Gas Purity Is Important

—BY M. KEITH DUNHAM*

Dissolved acetylene, or tank acetylene, as it is more commonly called, has been widely adopted in the last two years by users of the oxy-acetylene flame, and the fact has created considerable discussion relative to its cost, safety and purity in relation to acetylene generated on the premises. Some of the claims made for it are wildly exaggerated—against it are others equally misleading. A comparison, therefore, of the two methods is of interest to the present or prospective user of the oxy-acetylene process.

GENERATORS AND THE RATE OF GENERATION

Generators are of two types: one, the low-pressure, delivering the gas to the welding torch under pressure of a few ounces and requiring the use of an injector principle torch to secure the necessary volume and speed of acetylene; and the other generating the acetylene up to a pressure not exceeding 5 lb., the latter using a welding torch of a medium pressure type, or as it might be called a part injector, since it is still necessary to carry the oxygen under a higher pressure than the acetylene to secure the necessary speed of the gases.

Well constructed, passing the requirements of the fire insurance underwriters and using lump carbide, manufacturers of these types estimate the cost of acetylene at 0.9 cent per cubic foot, basing the price of carbide at \$80 a ton and the gas yield at $4\frac{1}{2}$ cu. ft. to the pound. In practice, however, it would be better to figure the actual yield at not more than 4 cu. ft. to the pound. Add to this figure the slight expense of charging and cleaning the generator, and it will total a minimum of one cent per cubic foot, probably a little higher.

The insurance requirements provide that the generator be separately housed in a building which must be heated by steam or hot water, and electrically lighted, and from this building the gas is piped to the welding room. A further requirement and one which is of the utmost importance to the user, is that the carbide capacity be sufficient to allow the cool generation of the gas. Specifically, this calls for a gallon of water to a pound of carbide, and does not allow the hourly consumption of gas to be greater than 1 cu. ft. to the pound, that is, a generator with a 50 lb. capacity shall not generate in excess of 50 cu. ft. per hour. To exceed this materially means undue heating, impure gas and consequently poor results in the weld.

Carbide is a manufactured product, made from coke and limestone. It is wholly impossible to have these materials chemically pure, and the gas generated must contain some impurities—their extent of course depending upon the purity of the carbide. Abroad, where oxy-acetylene welding made its start, and whence many of our ideas are imported, a chemical purifier is universally used.

IMPORTANCE OF A PURE GAS

In this country such a purifier is not employed, except by manufacturers of dissolved acetylene, because of the fact that carbide manufactured in this country is of a much higher grade than that made abroad. But is it of such high grade that a chemical purifier is unnecessary? There can be no question that the gas generated does contain sulphurous and phosphorous elements, and these elements, even in minute quantities, are detrimental to a steel weld.

The generator is equipped with a screening device, such as felt, to remove free particles of lime dust and dirt, which may come from the carbide, but the introduction of a chemical purifier, while not costly or expensive to maintain, has been deemed unnecessary by generator manufacturers, because the phosphorous or sulphurous elements are present in such small quantities. The user must determine, on his particular needs, whether such a purifier is necessary. Fortunately, he is able to do so by a simple testing device later described.

An apparatus passing the requirements of the fire insurance underwriters is practically automatic, the only labor required being the charging with carbide and water and cleaning. There are of course generators of the non-automatic type requiring constant service of an attendant, but comparisons should be made with the automatic type working under permitted conditions.

There can be no question that the manufacturing cost is at least one cent and that to this price must be added depreciation and interest on investment, which, however, will not materially increase the price per cubic foot. There remain to consider safety and convenience.

THE QUESTION OF PRESSURE GENERATORS

Undoubtedly, those generators passing the requirements of the underwriters must be classed as safe—yet it is always well to remember that the generating of acetylene gas may be attended with some danger. If we could be positive that at all

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times safety devices would operate, and if we could remove the human element, with his match or candle and his ingenuity to "improve" the apparatus, acetylene generation would be ideal in its simplicity and safety. We must consider, however, that beyond 15 lb. pressure, acetylene gas begins to be dangerous, and that the failure of a safety device to act at this pressure would mark the beginning of a danger point rapidly increasing in danger as the pressure increases.

It is because of this pressure hazard that the low-pressure type of generator is always used in the lighting field, and in many foreign countries the laws are such that the use of a pressure generator is forbidden, or restrictions made exceedingly difficult to meet. Why then, use the medium-pressure generator at all? Because undoubtedly a better welding flame is obtained under ordinary working conditions with both gases under pressure than where the acetylene is practically stationary and the velocity of the oxygen must be used to inject the correct proportion of the combustible gas. It is a fact that where the acetylene is under a very low pressure, the welding torch may consume double the volume of oxygen it properly should, unless the torch is made under the most careful conditions and as carefully used; that a torch with both gases under pressures comparatively equal, with the proper mixing device, will consume the correct proportions, and that a part injector torch—one with the acetylene under some pressure but the oxygen under a greater one—may use from 15 to 50 per cent more oxygen than it should.

These conditions have a direct bearing on the cost and quality of welding. If the torch used consumes a large excess of oxygen, steel welding is made difficult by the tendency of the flame to burn the material and oxygen, costing from 1½ to 2 cents per foot, is wasted, so that it is highly important then to ascertain the consumption of oxygen, and the quality of the flame in choosing the acetylene supply, because under some conditions acetylene at 1½ cents per cubic foot would be cheaper to use than acetylene at 1 cent per cubic foot.

There can be no doubt that the so-called medium-pressure generator offers the advantage of pressure and possesses the disadvantage of having a safety device acting very closely to the danger point. The low-pressure generator has the advantage of its safety device being set away below the danger point and the disadvantage of delivering the gas to the welding torch under only a few ounces pressure.

The convenience of the generator system is a big one. Carbide is easy to secure. There are stations in all the larger cities of the country, it suffers no depreciation if kept in a tightly sealed can, and the manufacture of the gas is simple and practically without care.

MANUFACTURE OF DISSOLVED ACETYLENE

Dissolved acetylene has been much better known in this country in the lighting industry than in the industrial world. The small copper plated cylinder has been a familiar sight on the running board of the automobile; larger tanks have been in wide use for buoy and lighthouse illumination, for block signaling on railroads and locomotive headlighting.

The proper manufacture of this cylinder presents difficulties not realized by the outside appearance. Acetylene in a free state becomes dangerous at pressures greater than 15 lb., yet the pressure in a dissolved acetylene tank will vary from 150 to 250 lb. To effect safety, the gas is absorbed by a liquid, much the same as water absorbs salt.

In practice, it would not be possible to keep a cylinder completely filled with a liquid such as is used to dissolve acetylene, because of its very volatile nature; therefore, to prevent any free spaces in the cylinder of any extent, it is completely filled with a porous material.

Different manufacturers use varying fillers such as asbestos, charcoal and infusorial earth, silk waste, etc. The point of interest to the user is only that this be sufficiently porous to allow the easy escape of the gas and that it does not sag or drop and leave a free space in the top of the tank.

Acetone, a product of wood alcohol, is the absorbing liquid usually employed. It has the property of absorbing twenty-five times its own volume of acetylene with each atmosphere of pressure, providing temperature is normal and the acetone reasonably pure and free from moisture.

The manufacture of acetylene for this system should be carried out with at least the same general care as with the welding generator, then the gas chemically purified for two reasons—one to remove the dust, sulphur, phosphorus and ammonia elements to secure a pure gas, and the other to remove water vapors, since moisture materially lowers the soluble qualities of the acetone.

Contrary to the general belief, I have very good reasons to know that all dissolved acetylene is not necessarily pure, basing this knowledge on a visit some time ago to a factory where the generator used was a 50 lb. one. Yet the average filling per hour was about 200 cu. ft.—the gas passing directly from the generator into the gasometer, and thence to the compressor, without the interposition of a purifier. Such a gas is dear to purchase at any price. It would give the very poorest results, and yet of course was sold as dissolved acetylene, which the user supposes, or is led to believe, is purer than generated gas made by himself.

TESTING ACETYLENE GAS FOR PURITY

The user of acetylene must then frequently test the quality of the gas, whether it be generated on the premises or purchased in cylinders. Here is a simple test:

Put a few drops of a 10-per cent solution of silver nitrate on a white blotting paper and hold in front of the acetylene opening—the regulator or hydraulic valve. If the paper turns dark quickly, the gas is impure. If it changes color slowly, there are impurities present but not in sufficient quantities to materially affect the weld. If the paper remains white, the gas is free from foreign elements.

There are three large companies manufacturing acetylene, two of which have been actively interested in the automobile lighting industry. With the apparent general trend of the use of electricity for this purpose, these companies are entering the field of the oxy-acetylene process. Their competition has led to very liberal concessions in the loan or rental of cylinders and it is no longer compulsory (as formerly) for the user to purchase these cylinders. Depending upon the size of the tank and quantity used, the gas may be purchased at 1½ to 2 cents per cubic foot, the latter price applying in small cylinders, the use of which is not to be recommended.

The Bureau of Explosives of the Interstate Commerce Commission provides certain specifications, covering the safety of the cylinder—strength of the shell, fusible plugs, porosity of the packing, etc.—amply protecting the user so far as danger is concerned.

CONSIDERATIONS IN USING DISSOLVED ACETYLENE

The porosity of the cylinder has a direct bear-

ing on the cost of the gas used. If the packing is too tight, or, in other words, the pores too close or too fine, the gas in the cylinder makes its way out with some difficulty when the pressure becomes low and at the same time carries with it some of the acetone, which reduces the heat of the flame and tends to carbonize the metal. An operator using a tank of this kind usually complains of "lack of heat" at low tank pressures, and is likely to have some difficulty in making the weld, and usually will change to a full tank, marking the other one as empty. There being no credit given on gas returned in cylinders, this gas of course is a total loss to the user. Cylinders of this type also are not likely to allow the acetone to permeate the filling thoroughly and result in considerable of this liquid being drawn off with the gas to the detriment of the weld.

The cylinder valve must also be large enough to permit plenty of volume to pass through at low tank pressures.

Since the acetylene is absorbed, the tank pressure does not indicate the cubical contents of the cylinder. The same size cylinders may in one instance indicate 250 lb. pressure and contain 150 cu. ft. of gas, and in the next have only 150 lb. pressure and 250 cu. ft. It depends entirely upon the amount, purity and dryness of the acetone. Weight is the only practical method to determine contents. Weight of cylinder full, less the weight empty, times 14.5 (the number of cubic feet to the pound) gives the cubical contents.

Acetone will give up the acetylene freely only at a certain speed, this speed being estimated at an hourly consumption not greater than one-seventh of the cubical contents of the cylinder. That is, if a 225-cu. ft. cylinder is being used, the welding torch should not consume more than 32 cu. ft. per hour. If this consumption is exceeded, the acetone will be drawn out with the gas. More or less, however, this rule will depend upon the purity of the acetone and the packing of the cylinder, and in some cases, it is desirable to reduce this consumption if economical results are to be obtained, especially if the porosity of the cylinder is insufficient.

There are then various qualities of dissolved acetylene—and the purity of the gas, the acetone, the porosity of the packing—must all be taken into consideration in a comparison of the methods of securing the acetylene supply.

PRESSURES AND THE ECONOMICAL USE OF GAS

Curiously enough, the one big factor in comparing cost seems to be entirely lost sight of by everybody, and that factor is pressure. Using dissolved acetylene, a torch may be employed with both gases under about the same degree of pressure, resulting in practically an equal consumption of both gases, if the mixing chamber embodies the correct principle; such a torch will produce a better welding flame, because the oxygen is not used in excess, and the effect of the flame be about neutral, and will not waste the oxygen.

The user of dissolved acetylene, therefore, if cost and results are to be taken into consideration, must carefully investigate the apparatus to ascertain the gas consumption of the welding torch; to use a torch constructed on a low-pressure principle, while entirely possible, is extremely wasteful and the torch chosen must take advantage of the pressure of dissolved acetylene to effect the proper saving in oxygen.

It is safe to figure the cost of dissolved acetylene at the user's place at 1¾ cents per cubic foot. Re-

filling stations are so numerous that practically all the larger cities of the country are within trucking distance. In isolated instances, the cost might reach 2 cents.

The advantages of dissolved acetylene are the elimination of the initial investment, consequently no depreciation; safety; purity (if properly manufactured), and simplicity and ideal operating conditions of the apparatus, if it is made to take advantage of the importance of pressure.

Its disadvantages are a higher cost per cubic foot; the absolute dependence of the user on the factory efficiency and shipping facilities of the manufacturer, and the waste of the gas left in the cylinder.

In general, then, the user must realize the importance of the purity of the gas and frequently test it; he must determine by a meter, or by ascertaining the relative consumption of the gas in the welding torch, how many cubic feet of gas he is getting per pound of carbide; he must weigh, full and empty, each dissolved acetylene cylinder, to definitely determine cubic feet, and finally, he must be very careful in his choice of apparatus to have the welding torch construction in harmony with the acetylene supply.

It is idle to figure the cost per foot of the gases used, if in their use, a large percentage is wasted. It is equally idle, then, simply to estimate that generated acetylene costs 1 cent and dissolved acetylene costs 2 cents. The chief thing to determine is the cost and quality of an actual operation, and to ascertain this the entire apparatus—not merely the acetylene supply—must be considered.

Thermal Insulation for Furnaces

A paper entitled "Thermal Insulation of High-Temperature Equipment" is to be presented at the San Francisco meeting in September of the American Institute of Mining Engineers by P. A. Boeck, chemical engineer, Kieselguhr Company of America, New York City. It is devoted mainly to the application of an insulating medium known as Sil-O-Cel, manufactured from deposits occurring, for example, on the Pacific Coast and worked by the Kieselguhr Company. From the paper the following has been taken:

The insulator used, known as celite, on account of its extremely cellular nature, is a mineral product of a highly siliceous composition and of very light weight, which occurs on the Pacific Coast in an exceptionally pure state. It is composed of numerous hollow cells, and weighs, in its natural rock form, air dried, from 25 to 30 lb. per cubic foot. When this material is ground properly, so as not to destroy its cell structure, Sil-O-Cel powder is produced, which weighs but 8 lb. to the cubic foot and has a thermal insulating power about equal to that of cork, or from ten to twelve times the insulating power of ordinary firebrick. In other words, a 1-in. layer of this material is the equivalent in insulating value of from 10 to 12 in. of firebrick. Being almost pure silica, its melting point is high, 2930 deg. Fahr. (1610 deg. C.), as reported by the Bureau of Standards, and it can be subjected to high temperatures without fear of alteration.

It has been found advisable, however, not to use celite as a refractory at extremely high temperatures without some direct protection. This is readily accomplished by using it as a backing material for more refractory and highly conducting bodies. Owing to its remarkable non-conducting properties, the accumulation of heat on its face is so great, owing to the fact that the surface is not cooled by

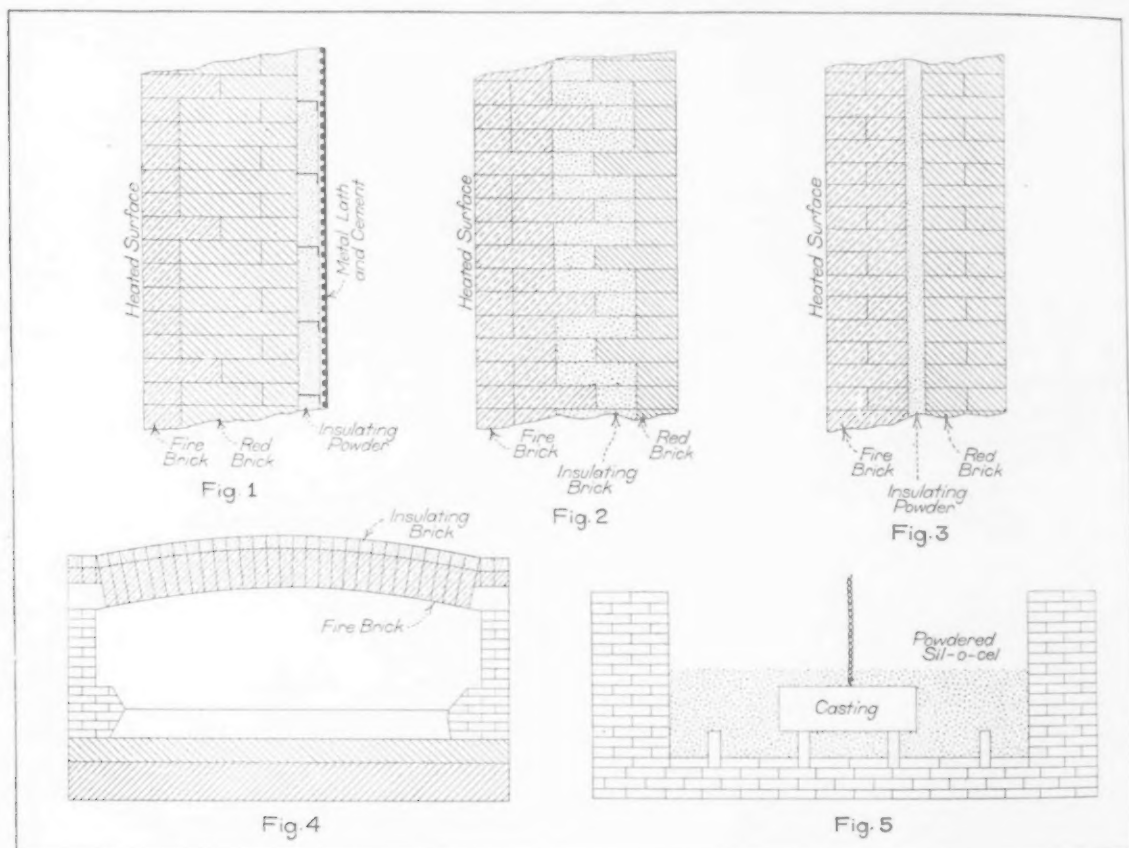
conduction, that a "flash" of flame or gases might easily exceed the melting point of silica and cause failure. If it is protected, however, only modified and uniform temperatures are encountered, which are maintained without risk or damage.

It is possible further to prepare bricks and blocks of various sizes and shapes by sawing the natural material by means of gang saws. Standard 9-in. straight Sil-O-Cel brick made from natural celite weigh from 1½ to 2 lb. each and are equivalent in insulating value to many times their thickness of ordinary firebrick. In crushing strength, these brick withstand over 400 lb. per square inch and are sufficiently strong to stand transportation and handling.

The cost of these insulating bricks is but little more than that of firebrick, and of the powder about one-third as much, so that the first cost of this insulation is comparatively low. In fact, instances are on record where the entire cost of insulation has

packed slightly to a density of approximately 12 lb. to the cubic foot, at which point it attains its maximum insulating value and is not subject to settling or contraction due to either vibration or heat. Where this form of construction has been in severe service in high-temperature furnaces for a period of years no contraction or settling has taken place.

Fig. 1 indicates the method of insulating brick walls which are already in place. This form of insulation can be applied to old construction as well as new. In this method, expanded metal lath is erected on angle irons at the required distance from the outer wall and coated on the outside with one or more coats of portland cement plaster, to which a small amount of Sil-O-Cel powder, approximately 20 per cent by volume, has been added to give greater plasticity and ease of working and to increase the heat-resisting properties of the cement. Sil-O-Cel powder is packed to a density of 12 lb. per



USE OF HEAT INSULATING BRICK AND POWDER

Fig. 1—Insulating Powder Supported by Metal Lath, Which Is Given a Cement Finish. Fig. 2—Insulating Brick Laid in Wall. Fig. 3—Insulating Powder in Hollow Wall. Fig. 4—Reverberatory Furnace Roof Covered with Insulating Brick. Fig. 5—Annealing Pit Containing Insulating Powder for Slow Cooling of Castings

been saved in fuel in the first few weeks of operation.

GENERAL TYPES OF INSULATION

In general, there are four forms of construction for high-temperature insulation which can be adapted to almost any character of equipment.

Fig. 2 indicates the usual method of using Sil-O-Cel brick interlaid between a course of firebrick and red brick for the prevention of heat leakage through walls. This form of construction is largely used in boiler settings, bakers' ovens, reverberatory-furnace walls and roofs, etc., and is generally applicable where a strong, solid, nonconducting wall is desired.

Fig. 3 indicates one of the methods of construction of an insulating wall in which an otherwise hollow space is filled with insulating powder. From 2 to 4 in. are usually sufficient. The powder is

cubic foot between the brick wall and the expanded metal lath.

In reverberatory furnaces Sil-O-Cel has found application as an insulating material for roofs and furnace walls in the manner indicated in Fig. 4.

An application of the use of powdered Sil-O-Cel in annealing castings and other heat-treated metal forms is illustrated in Fig. 5, which shows an annealing pit partly filled with Sil-O-Cel powder, in which the castings are placed or suspended by chains until they are cooled to the proper degree for working. The annealing pit is built of brick and the depth of powdered Sil-O-Cel which is used is determined by the size and shape of the castings to be annealed and the rate at which cooling is desired. This material has also been used as a packing material in boxes in which the metals to be heat treated are placed, the entire box being heated and allowed to cool slow.

SPRAYING SHRAPNEL SHELLS

High-Production Machine for Giving a Measured Protective Coating to Inaccessible Spaces

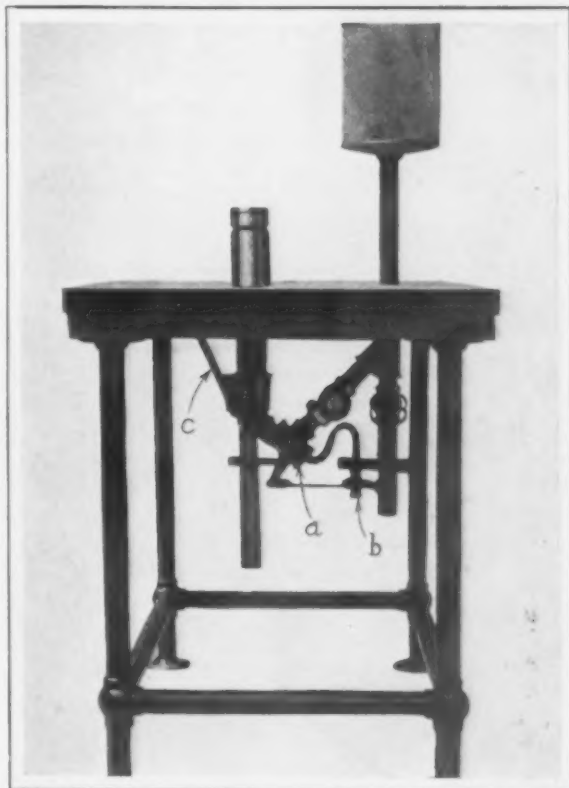
To coat the inside of shells, or for that matter any relatively inaccessible surface, with an asphaltum paint or anticorrosion material, and to do the work rapidly, uniformly, and without waste of the coating compound, the Spray Engineering Company, Boston, Mass., has developed an interesting machine.

The machine looks not unlike a strongly built table. There is a circular recess in the top. The operator inserts a shell over the recess, pushes it down an inch or so in the recess, lifts it from the table, and the operation is completed, the shell having received its coating. He is then ready to repeat the operation with another shell. As the period covered in thus spraying a shell is 2 sec., or at the rate of 30 per minute, the capacity of the machine for coating is placed at 1500 per hour.

The act of pushing the shell downward admits a supply of compressed air to a definite quantity of the protective liquid, which is driven through a spraying nozzle. The apparatus is supported under the table top. It includes what is substantially a three-way valve which holds the protective liquid and which opens the channel between the compressed air supply and the nozzle when the shell is down, so to speak, and which receives the measured amount of liquid for the next shell when the pressure of the operator's hand is removed; that is, when the coated shell is removed. The fact that only the desired amount of liquid is admitted each time is a particular feature and application has been made for a patent covering the device. The working parts are counterbalanced as far as possible so that a minimum pressure will suffice to push the shell to the spraying position. It is obvious the machine is likely to find fields of usefulness outside of that for which it has been brought into being.

The accompanying reproduction of a photograph will help to gain an idea of the machine. The supply of protective paint is contained in the tank above the table, supported by its delivery pipe. Immediately underneath the table top, the paint is conducted through the Y fitting to the measuring device or chamber, the straightaway branch shown being merely to empty the machine of the paint when desired. The measuring chamber is indicated at *a*. At *b* is the valve controlling the admission of compressed air through the measuring chamber and thence to the spray head. The downward movement of the shell, by means of a simple lever mechanism, turns the measuring chamber so that the ports put the air line into communication with the nozzle line, and it also opens the air valve *b* so that the shell is then sprayed, in a substantially automatic fashion. At *c* is a counterbalancing spring which works to bring back the mechanism to the position for receiving another shell and at the same time turning the measuring chamber so that it can take its next supply of paint.

The height of the spray head is adjusted to coat the entire inner surface of the shell and the extent of this surface with the prescribed thickness of the paint film, sometimes 0.00025 in., gives some measure of the requirements. The amount of paint is regulated by what corresponds to a plunger at the end of *a*, which may be screwed in or out, decreasing or increasing the contents of the measuring chamber. For a given size of shell and a given paint and thickness of film, it is found that one setting of the measuring device suffices to insure



The operator inserts the shell in a recess in the table top, and with a slight pressure of his hand, a supply of compressed air is admitted to a chamber containing an automatically measured quantity of protective paint, and the air drives the paint on through a spraying nozzle located to coat the shell interior.

that not only is sufficient paint sprayed upon the shell surface but there is no excess which has to be disposed of. The machine thus aims at a maximum economy of the protecting compound beside allowing for high working speed.

It is expected that the fundamental elements of the machine, the use of the spray head, and of the scheme for automatically measuring out the quantity of material to be sprayed, may have applications apart from war munitions. However, at this writing the company is engaged on working out details for utilizing the machine for spraying the small annular passage in the timing device or nose portion of the shell. This passage, which receives the timing fuse, is small and somewhat inaccessible, and to swab the passage with a hand brush consumes too much time in view of the demands for high quantity production. It appears that in spite of the fact that the timing parts of the shell are of brass, the powder has a corroding influence, which fact makes it desirable to protect the brass work.

The Spray Engineering Company, which is located at 93 Federal Street, Boston, has been in business a number of years as an engineering firm specializing in spraying applications, as for cooling ponds for power plants, for air washing, and for spreading heavy oils in road building, and has manufactured its spray head. This develops a helical current or stream as well as a straight line current within the nozzle, so that on issuing the nozzle discharge may be termed a solid cone as differentiated from a hollow cone. Lee H. Parker, for ten years with Stone & Webster, Boston, is president of the company, and John T. Clark, treasurer.

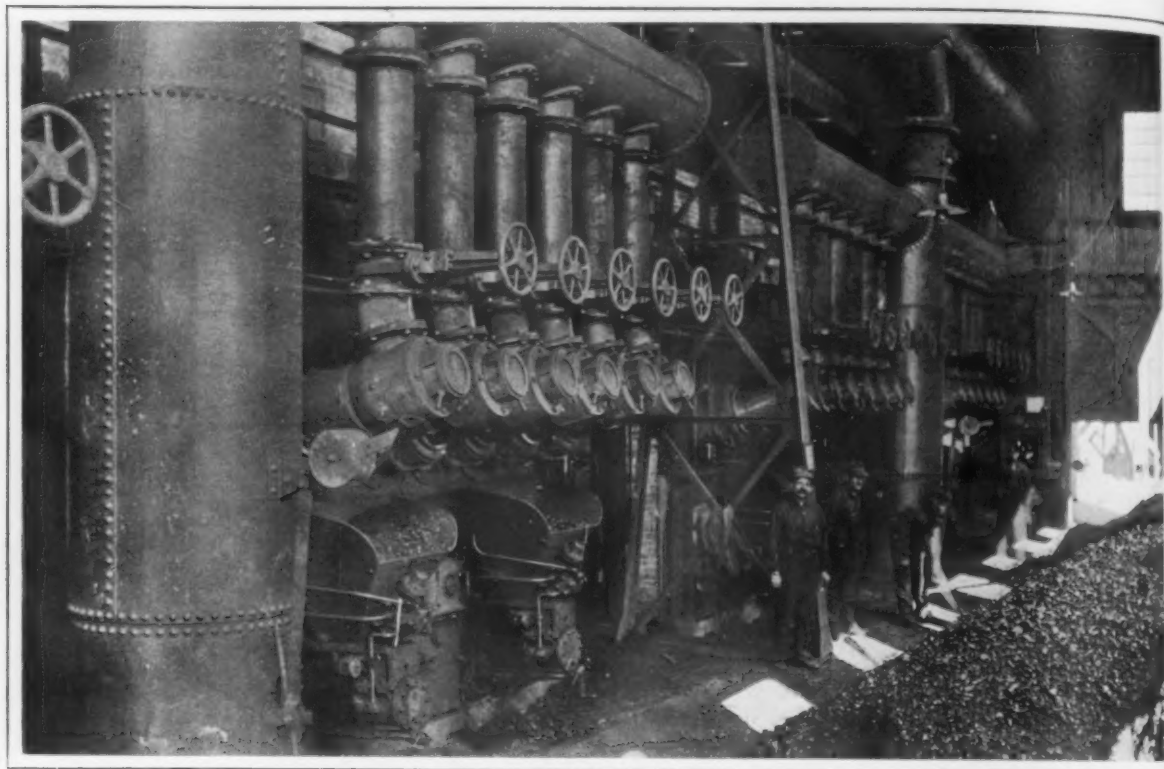
The conversion chart of Centigrade and Fahrenheit temperatures, which was printed in THE IRON AGE of July 1, 1915, is now available as a reprint and those of our readers who desire copies will receive them without charge on application.

HOT-BLAST STOVE GAS BURNERS

Special Type for Power Boilers and Stoves Using Blast-Furnace Gas

The increasing importance of blast-furnace gas for power purposes places a premium upon its economical use as fuel, not only in the heating of hot-blast stoves, but also where it is burned under

quantity of gas requisite to perfect combustion. As a result, either gas was wasted with prodigality or was burned with singular inefficiency from the standpoint of resulting temperatures. With the placing of a greater value upon efficiency in the burning of gas, it has also come to be realized that the supplementary burning of gas in a coal-fired boiler is necessarily attended by incomplete combustion because of the essential provisions for coal

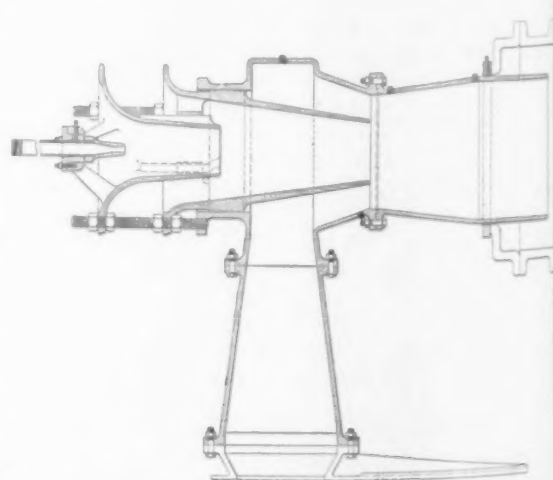


An Installation of Birkholz Burners at the South Chicago Plant of the Wisconsin Steel Company Where Ten 350-Hp. and Four 800-Hp. Boilers Are So Equipped

boilers. In the operation of the hot-blast stove closer attention is being given to the efficient heating of the checker work, both with respect to the temperature and analysis of the chimney gases and the cleanness of the brick. A greater appreciation of the heat losses in the stoves is apparent also, and what was a tendency in the direction of a larger number of stoves for each furnace is now a movement in the direction of the least number of stoves compatible with the necessary blast temperatures.

An important requisite to maximum economy in the heating of stoves is the effecting of a complete combustion of the gases through the use of an efficient burner. To meet this need the Birkholz-Terbeck burner has been installed at a number of steel works, and to provide for a like efficiency in the equally important operation of burning gas under boilers a Birkholz burner of similar design has been installed at some of the boiler plants of the steel mills at South Chicago. Admitting the gas in a stream through a rectangular box with no other attention to the quantity of air available for combustion than is represented by such openings as chance to remain around the gas burner, or by the crude regulation obtained through stopping up these openings with an occasional brick, has been the common practice, whether the gas was being burned simply as a supplement to coal-fired boilers or for exclusively gas-fired boilers. Such a hit-and-miss arrangement actually took no cognizance of the definite relation between quantity of air and

firing, which preclude proper regulation of air supply for gas firing. It is now accepted as the best practice at plants where gas is burned to equip as many boilers for the exclusive burning of gas as can be taken care of continuously with the assured supply of gas, thus securing a maximum economy. For the burning of excess gas or the handling of peak loads, boilers equipped for combined burning of coal and gas may then be used



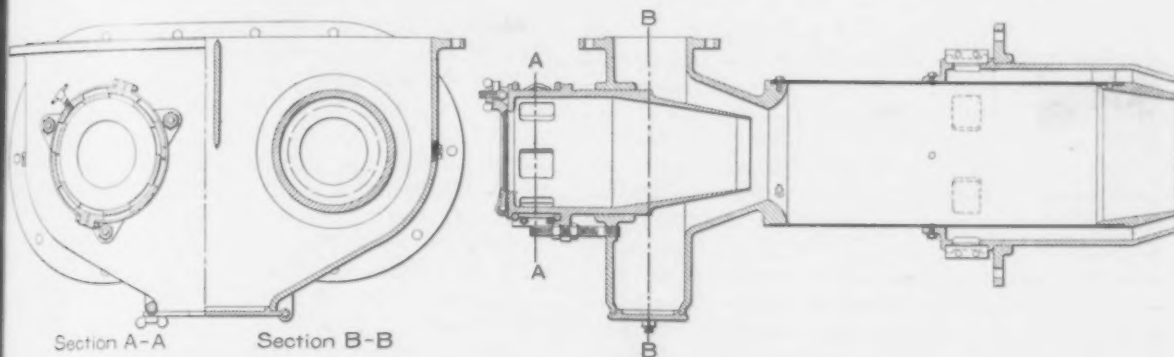
Partial Cross-Section of the Atmospheric Burner for Gas Fired Boilers, the Burners Being Arranged in Duplex Form, One Set for Each Boiler

intermittently or until additional exclusively gas-burning units may be installed.

In connection with the boilers burning gas exclusively, claims made for the Birkholz burner are especially emphasized. Thus burner makes use of the Bunsen principle, and is designed for operation under three conditions: the atmospheric burner, for boilers, and in addition the pressure burner and the induced-draft burner for the hot-blast stove. A cross-sectional drawing of the boiler burner is shown in one of the accompanying line drawings. Of these types the first two are similar in all respects except the pressure under which the mixture of gas and air is effected. In the natural-draft

is accomplished. With such a burner the amount of checker work in each stove can be increased, particularly in the combustion chamber, a saving impossible under other conditions of gas burning. The interval in which the stove is on gas can be reduced very considerably, instances being recorded where this time has been cut from 236 to 125 min. With these economies it is quite possible to reduce the number of stoves, and at one plant three stoves are now used for a 600-ton blast furnace instead of five, as formerly.

In the case of the induced draft burner, air is admitted to the burner under pressure through a connection made from the cold-blast air line. The



Cross-Section of the Induced Draft Burner for Hot-Blast Stoves

burner the kinetic energy of the gases, ejected through a circular nozzle, draws in through openings in the burner the primary air with which it mixes in the mixing tube, with a violent whirling motion. Through other openings at the end of the mixing chamber, secondary air is introduced in just the right quantity to complete combustion. The admission of both primary and secondary air is accurately controlled by rotating slides which adjust the entrance ports to the right aperture to admit the required amount of air. Determination of the proper burning of the gas is rendered exceedingly simple by reason of a large sight glass in the end of the burner through which one may look directly into the mixing tube at the combustion flame. When properly burning, this flame is colorless, as is normal with the Bunsen type of burner. Adjustments of the air-controlling slides immediately produce changes in the character of this flame so that optical evidence of the proper adjustment becomes easily recognizable even to the common laborer in whose charge the boiler room may be.

The design of the burner with respect to the gas nozzle and mixing tube contributes to the whirling action of the gas and air and their intimate mixture. As a result a very short and exceedingly hot flame is produced, thus eliminating disadvantages of a long flame or of the delayed combustion of gases, both in the boilers and in the hot-blast stoves, at places where brickwork is costly to repair and difficult to clean. In the experience with these burners at the boiler plants of the steel mills at Chicago it is stated that a saving of about 20 per cent of gas has been effected through the securing of this more perfect combustion and higher flame temperatures. Frequent analyses have shown in the stack gases nearly 27 per cent CO_2 , no CO and no excess oxygen.

Where the pressure burner is used the primary air connection is brought from a fan, and the stoves being tightly closed, a positive pressure is maintained inside. Thus, channeling of the gases is almost entirely eliminated, and a more efficient transfer of heat from the gas to the checker work

relative cheapness of the air compressed in the blowing engine as contrasted with any other method makes this arrangement exceedingly economical.

American Uniform Boiler-Law Society

At a meeting held in New York City on July 28 at the Waldorf-Astoria Hotel, an association was formed under the name of the American Uniform Boiler-Law Society. Plans were outlined for the raising of at least \$12,000 annually to promote the use of the standard boiler code established by the American Society of Mechanical Engineers. The following were elected and appointed on the administrative council, and it was decided that the members of the administrative council representing the respective branches should see that the contributions were made by the different interests:

Water-tube boilers—Isaac Harter, Jr.
Locomotives—John Wynne.
Material manufacturers and dealers—D. J. Champion.
American Boiler Manufacturers Association—E. R. Fish.
Tubular boilers—T. E. Durban.
Threshers and road rollers—H. P. Goodling.
Hoisting engines—H. N. Covell.
Cast-iron heating boilers—Frederick W. Herendeen.
Steam shovel interests—Walter Plehn.
Insurance interests—Chas. S. Blake.
Low-pressure heating boilers—M. F. Moore.
Large users.

The Art Metal Construction Company, Jamestown, N. Y., held a convention of its selling force, beginning July 21 and continuing until July 24. The salesmen assembled from all parts of the country, and the sessions were of a highly practical character. Demonstrations were given of various products of the company and numerous addresses were made by the managers of its departments.

W. M. Duncan, receiver for the Wheeling & Lake Erie Railroad, has filed an application in the United States court in Cleveland for permission to sell \$2,000,000 in receivers' certificates, the proceeds to be used in purchasing 1700 freight cars.

Making of War Munitions at Private Works

GOVERNMENT SEEKS DATA ON AVAILABLE CAPACITY

Not Now in the Market but an Emergency May Arise—Details Herewith Indicating Character of Munitions That Would Be Required—President to Confer on Defense Program with Chairmen of House and Senate Committees

(With Supplement)

WASHINGTON, D. C., Aug. 9, 1915.—The Government has always recognized that its own arsenals would be entirely inadequate for the supply of war material which would be required to meet an emergency of war, and it has been its usual practice, in time of peace as well as in time of war, to call upon the private industries of the country for the supply of a good deal of material of this class. To this end the Ordnance Department endeavors to keep itself informed as to the establishments in the country which are able to produce war material of various classes, and their capacity for such production. The demand for war material by European belligerents has caused such kaleidoscopic changes and such an unexpected expansion of the facilities of American manufacturing companies, particularly for the production of certain classes of ammunition, that corresponding increase of activity on the part of the Ordnance Department is entailed in order that its information may keep reasonable pace with this expansion. While this expansion has probably not yet ceased, it has reached such a stage as to warrant something like a general inquiry on the part of the Government as to the manufacturing facilities which have already been called into existence, and to this end letters of inquiry are being sent out to manufacturers, accompanied by certain illustrative sketches and forms for the purpose of making replies easier.

It will be understood, of course, that the War Department is not now in the market for such material, having no special funds which are applicable for its purchase, and the limited funds which are at its disposal from current appropriations not requiring any special inquiry for their expenditure.

Text of the Letter of Inquiry

The letter of the Ordnance Bureau addressed to manufacturers is as follows:

"GENTLEMEN: 1. Prior to the outbreak of the present European war the Ordnance Department compiled from the best data then available the probable output of ordnance material from establishments in this country that might be expected, in the event of an emergency. The enormous expenditure of such material in the present conflict abroad, however, indicates that the estimates of the department for a reserve supply and for an increased output in case of war have been too low, and a larger production must be provided for.

"2. While it is generally understood that the increased demand for war material has resulted in a marked expansion in many of the commercial plants of this country for the production of this class of material, it is believed that there are a number of plants not now so engaged, which with their present equipment or relatively minor additions thereto, could undertake the manufacture of certain articles, which in the event of an emergency would be required in large quantities. Among the articles large quantities of which would be needed, are shrapnel cases, shrapnel heads, common steel shell, parts of fuses, and brass cartridge cases. These articles with their principal dimensions and general specifications are shown on the inclosed print and this department would appreciate any information you may care to give concerning the present or prospec-

tive capacity of your own plant for their production.

"3. A blank for this purpose is inclosed and you will note that provision has been made for entering the capacity of your plant for the forgings without the machine work, for the machine work only, and for furnishing the completed article. Of course, it is to be understood that the department is not now in the market for this material and that no promise of an order is involved in this inquiry.

"4. Where more than a month is required after receipt of order to reach the maximum production, kindly state the output for each month until the maximum shall have been reached.

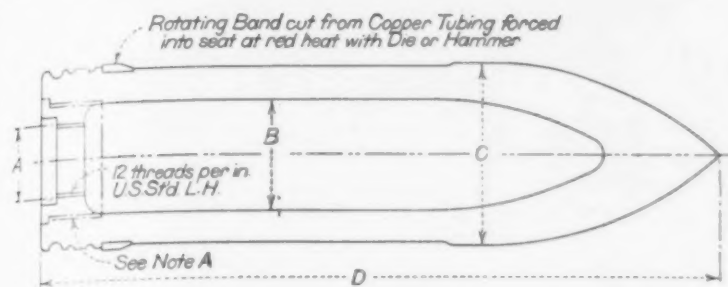
"5. Any reply which you may make to this inquiry will be considered as confidential if you so desire."

Accompanying each inquiry is this schedule of the items concerning which the bureau desires the information as to the manufacturers' capacity:

Capacity of.....
(Name and Location of Plant)
for the production of war material.

(Date)

Name of Article	MONTHLY RATE OF PRODUCTION IN UNITS					
	ONE SHIFT			TWO OR MORE SHIFTS		
	Forging	Ma- chining	All Opera- tions	Forging	Ma- chining	All Opera- tions
Shell:						
3"						
3.8"						
4.7"						
6"						
Cartridge case:						
3"						
3.8"						
4.7"						
6"						
Shrapnel case:						
2.95" or 3"						
3.8"						
4.7"						
6"						
Shrapnel head:						
2.95" or 3"						
3.8"						
4.7"						
6"						
Diaphragm:						
2.95" or 3"						
3.8"						
4.7"						
6"						
Fuse parts:						
Stock (large caliber)						
Stock (medium caliber)						
Rear plug (large caliber)						
Rear plug (medium caliber)						
Front plug						



COMMON SHELL

Caliber	A	B	C	D
3. in.	1.5	2.	3.	11.6
3.8 in.	1.5	2.5	3.8	14.7
4.7 in.	1.5	2.8	4.7	18.5
6. in.	1.5	4.5	6.	27.

NOTE A—3-in. have closed in base.

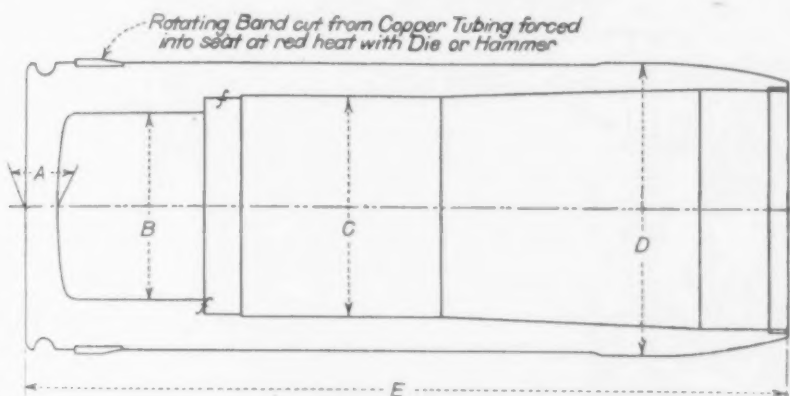
3.8-in made with either closed in base or base plug.

4.7 and 6-in. have base plug.

No physical qualities are prescribed for the steel in the shell, but ballistic tests are prescribed which require that a high grade of forged steel, preferably alloy steel, be used.

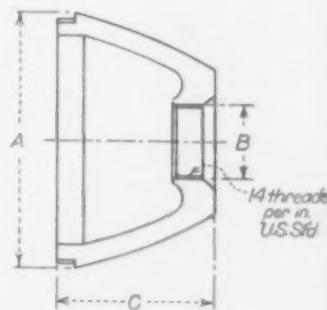
All shells are subjected to an interior hydraulic pressure of 2000 lb. per square inch and to an exterior hydraulic pressure as follows: 3 in. and 3.8 in., 20,000 lb. per square inch; 4.7 in., 15,000 lb. per square inch; 6 in., 20,000 lb. per square inch on the base and in rear of the rotating band and such lesser pressure as will not deform the shell, over the remaining portion.

The 4.7-in. shell is tested by firing it through a 3-in. medium steel ship plate. This requires a heat-treated projectile.



SHRAPNEL CASE

Caliber	SHRAPNEL CASE					SHRAPNEL HEAD			DIAPHRAGM		FORGING	
	A	B	C	D	E	A	B	C	A	B	A	B
2.95 in.	0.3	2.2	2.5	2.95	7.2	2.85	1.7	1.05	2.5	0.45	7.25	3.
3. in.	0.375	2.1	2.375	3.	8.5	2.73	1.7	.87	2.36	0.45	8.66	3.05
3.8 in.	0.5	2.5	2.9	3.8	10.12	3.51	1.7	1.4	2.89	0.55	10.3	3.85
4.7 in.	0.6	3.	3.5	4.7	13.	4.25	1.7	2.3	3.52	0.7	13.2	4.75
6. in.	0.8	3.9	4.6	6.	16.45	5.33	1.7	3.35	4.6	0.8	16.6	6.05



SHRAPNEL HEAD

Commercial Cold Drawn Steel

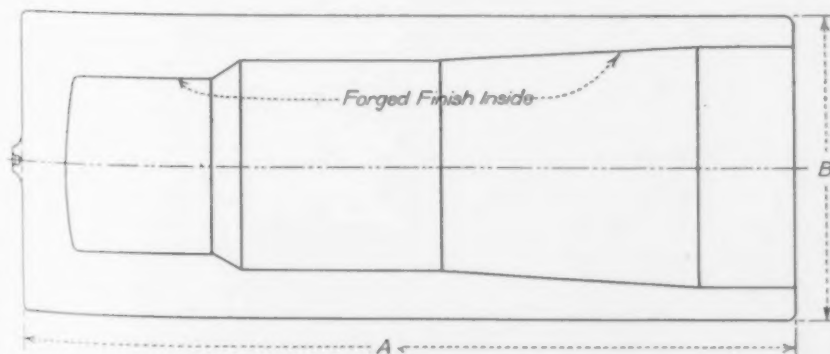
Shrapnel case forgings will have the properties and permit of finish machining cases will have the same physical properties.

Caliber	Tensile Strength	Elastic Limit
2.95 in.	120,000	90,000
3. in.	120,000	90,000
3.8 and 4.7 in.	110,000	80,000
6. in.	110,000	80,000

The maximum elastic limit for the cases shall not exceed 115,000 lb. per sq. in. 3.8-in., 4.7-in. and 6-in. shall not exceed 110,000 lb. per sq. in.

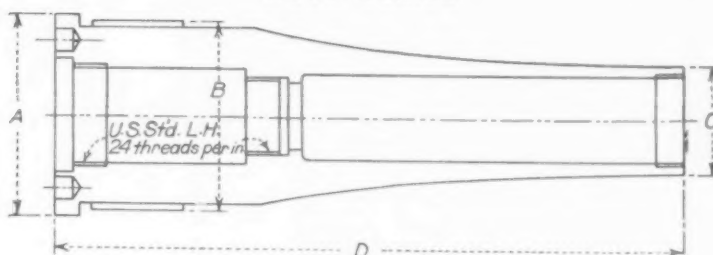
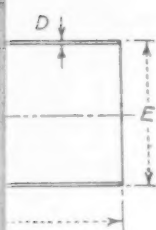
All shrapnel cases will be subjected to of 20,000 lb. per square inch up to the interior pressure of 1,000 lb. per square inch.

A certain number from each 1000 are by firing completed shrapnel from a gun 37,000 lb., except for the 6-in., which will 22,500 lb. per square inch.



SHRAPNEL CASE FORGING

FUSE PARTS



Stock—Large Caliber

Forged Steel

Treated after machining for the following physical qualities:

Elastic limit	120,000 lb. per sq. in.
Tensile strength	140,000 lb. per sq. in.
Elongation in 2 in.	12.5 per cent
Contraction of area	20 per cent

E	F
3.05	10.8
3.75	14.4
4.75	16.8
6.25	10.

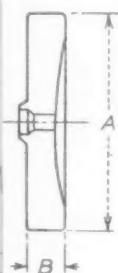
A	B	C	D
2.2	2.	1.15	7.

Stock—Medium Caliber

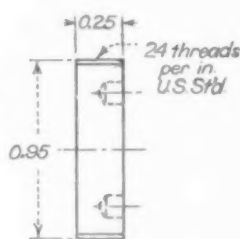
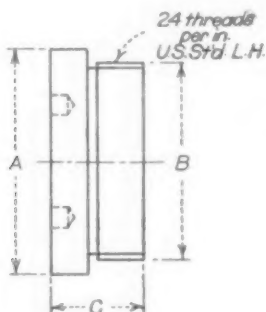
Commercial Cold Drawn Steel

Some also required of forged steel with above physical qualities.

A	B	C	D
2.	1.5	1.1	5.



For Diaphragms a good grade drop forging or equivalent is required



DIAPHRAGM

REAR PLUG

Forged Steel

LARGE CALIBER

A	B	C
1.2	1.065	0.5

MEDIUM CALIBER

A	B	C
1.25	0.94	0.375

FRONT PLUG

Forged Steel

the following minimum physical qualities with reasonable ease. Shrapnel

	Elongation in 2 In.	Contraction
0	16 per cent	45 per cent
0	16 per cent	45 per cent
0	15 per cent	40 per cent
0	15 per cent	40 per cent

ne 2.95-in. and 3-in. forgings and r square inch, and in case of the eed 110,000 lb.

d to an exterior hydraulic pressure the rotating band seat and to an re inch.

are also subjected to a ballistic test gun with a maximum pressure of h will be fired with a pressure of

President to Confer with Committee Chairmen

President Wilson will return to Washington this week and will once take up what he regards as the most important work now before the Administration, namely, the formulation of a "sane, reasonable and practical program for the national defense." Announcement of the President's instructions to the Secretaries of War and the Navy has been followed by a vast amount of comment which the President has very attentively observed. Public opinion appears to be overwhelmingly in favor of the President's plan as a broad project and the people at large seem to be prepared not only to use their influence with their representatives in Congress to carry out a comprehensive scheme, involving the expenditure of a large sum of money, but also to accept uncomplainingly any new fiscal legislation that may be necessary to provide funds for the required naval and military expansion. At the same time it has been made perfectly clear that the advocates of the so-called peace policy will have considerable influence in Congress and that for one reason or another some of the most influential representatives and senators are lukewarm toward the program of the Chief Executive.

In view of these conditions, President Wilson has decided to adopt diplomacy, at least at the outset, in the effort to unite all factions in Congress. There is no doubt, however, that he is prepared to make a last-ditch fight to obtain the legislation he desires in the event that he cannot win over the opposition. Within the past few days the President has addressed personal letters to Senator Chamberlain of Oregon, chairman of the Senate Committee on Military Affairs; Senator Tillman of South Carolina, chairman of the Senate Committee on Naval Affairs; Representative Hay of Virginia, chairman of the House Committee on Military Affairs, and Representative Padgett of Tennessee, chairman of the House Committee on Naval Affairs, requesting them to come to Washington at an early date for the purpose of conferring on the subject of the improvement of the national defenses. Preliminary reports, covering the inquiries in the War and Navy departments recently directed by the President, have already been furnished by Secretaries Garrison and Daniels and the final reports, which are voluminous and exhaustive, will be laid before the President prior to his conferences with the chairmen of the Senate and House Military and Naval committees. It is the President's hope that with these data before them the Congressional leaders will recognize the demands of the situation and will pledge their hearty co-operation to the administration in the effort soon to be made to obtain appropriations at the coming session that will far exceed those of any previous Congress. Every effort will be made to avoid friction in carrying out the program, but the President has no intention of yielding upon any of the salient features upon which he and his advisers may agree.

No Plan of Militarism

President Wilson is disposed to be a little impatient at the criticism in some quarters that his policy "tends toward militarism." There is, of course, absolutely no ground for such a charge. When it is remembered that the present expenditures for both the military and naval services represent an annual charge upon the population of the United States of less than \$3 per capita and that the most liberal scheme of enlargement thus foreshadowed would not increase this tax beyond \$5, taken in connection with the positive statements of Administration officials that no form of compulsory military service is contemplated, the absurdity of any charge of militarism in connection with the program now being formulated will be appreciated.

It is reported on good authority here that the President will seek to impress Congress with the importance of putting the country in a better state of defense by confining his forthcoming annual message to this single topic, ignoring all other routine matters. This method of fixing the attention of Representatives and Senators has been utilized heretofore with much success, notably when President Cleveland, instead of forwarding to Congress the usual voluminous address devoted to a score or more of subjects, gave that body an electric shock by sending in a short, terse message of a few hundred words demanding a revision of the tariff. The message set the whole country talking and brought such pressure upon Congress that a new tariff law was speedily enacted.

The announcement of the coming conference between the President and the majority leaders in Congress naturally has started new rumors of a special session. The fact that nearly \$200,000,000 will be added to current expenses if the President's program is adopted, taken in connection with the enormous deficit the Treasury is now facing in view of the expiration of the emergency war revenue act and the repeal of the sugar duty, makes it probable that the conference with the Military and Naval chairmen of the two houses will be followed by others with the chairmen of the Senate Finance and House Ways and Means committees. Representative Kitchin of North Carolina, who is at the head of the Ways and Means Committee, has already expressed the opinion that Congress will be called together in October and has given some consideration to revenue problems, which must soon be taken up for treatment. Secretary of the Treasury McAdoo conferred with the President at Cornish in the past week on the state of the finances and it is believed will soon formulate a tentative plan for increasing the revenues. The fact that the first month of the new fiscal year closed with a deficit of approximately \$17,000,000, as compared with a substantial surplus a year ago, merely confirms the impression long entertained here that the present revenue laws are hopelessly inadequate even for existing conditions, to say nothing of the proposed expansion of the military and naval establishments.

W. L. C.

British Steel Trade and the War

In the eleven months of the war, Aug. 1, 1914, to July 1, 1915, Great Britain's exports of iron and steel, including scrap, have averaged 239,073 gross tons per month compared with 405,897 tons per month in the same period in 1913-14, a decrease of about 41 per cent. The *London Iron and Coal Trades Review* estimates the bulk of the export losses to be apportioned as follows: Pig iron, 344,000 tons; nails, 137,000 tons; galvanized sheets, 212,000 tons and tin plates, 57,000 tons.

In British imports of iron and steel the monthly average for the first eleven months of the war to July 1 was 75,070 tons, compared with 202,513 tons for the same months in 1913-14, an average decrease of about 63 per cent. In May and June this falling off was only 34 and 25 per cent respectively from the imports of May and June, 1914, in view of the receipt of considerable semi-finished material from the United States in those months.

Italy has declared the following as contraband of war: Ferromanganese, ferrotungsten, ferromolybdenum, ferrovanadium and ferrochrome; tungsten-molybdenum, vanadium, nickel, selenium, cobalt and manganese; wolframite, sheelite, molybdenite, manganese ore, nickel ore, chrome ore, hematite ore, zinc ore, lead ore and bauxite; aluminum, antimony, including sulphides and oxides, copper wrought or unwrought, copper wire, barbed wire, iron pyrites, chloride of tin and tin ore.

Electric Production of Pig Iron or Steel*

Factors Influencing Its Success in This Country—An Analysis of Conditions and Costs—The Ferroalloy Industry

—BY DORSEY A. LYON AND R. M. KEENEY—

Reduction processes, as a general rule, require a very low power cost, especially those operations producing a large tonnage of a comparatively cheap product which compete with combustion processes, as, for example, the electric smelting of iron ore and zinc ore. On the other hand, electric-furnace refining processes do not require for commercial success an extremely low power cost. Many electric steel furnaces are operated at a profit on a power cost of 1c. per kw. hr., or \$65.70 per hp. yr., while few electric-furnace reduction processes can operate profitably with a power cost of over 0.3c. per kw. hr., or \$20 per hp. yr., and for complete assurance of commercial success the power cost should be as small as from \$10 to \$20 per hp. yr.

But the commercial success of an electro-metalurgical enterprise does not depend entirely upon the cost of power. Freight rates have a large influence on it. Generally speaking, in the Western part of the United States no such enterprise producing a large tonnage would have much chance of success unless located within a few hundred miles of the sea-coast, because of the high freight rates prevailing in the West as compared with Eastern rates. The short distance to water shipment has been a large factor in the success of Norwegian and Swedish plants, as well as of those in Switzerland and the French Alps. Practically all of their product is exported to foreign countries by water, while most of their ore and coal or coke is shipped to them by sea. With the exception of some specific raw material near by, the cost of raw material will depend largely upon freight rates, for in the majority of cases at least the ores used must be brought from a distance.

FERROALLOY PRODUCTION

The growth of the ferroalloy industry in Europe has been rapid since 1899, but comparatively slow in the United States. There are about twenty-five European plants engaged in the manufacture by the electric-furnace method, as compared with two in the United States. There is, however, an electric-furnace ferrosilicon plant in Canada, at Welland, Ont.

There are several reasons why the growth of this industry has been slower in America than in Europe. Hydroelectric power is not so cheap here, and not so favorably located for the receipt of raw material and the sale of product. The water-power sites cannot be developed as cheaply as many of the foreign sites, where the cost of electric power per horsepower-year varies from \$7 to \$15 as compared with \$15 to \$30 in the United States, for power delivered at the manufacturing-plant transformers. In Canada power is somewhat cheaper, but is often located in inaccessible places. Most of the Norwegian and Swedish plants are located at tidewater or on navigable rivers. French works are within a couple of hundred miles of Marseilles. The use of ferroalloys in the manufacture of high-class steels did not advance as rapidly in the United States as in Europe, and owing to less favorable natural conditions electrochemical and electrometallurgical industries in general have not had so rapid a growth here.

A large proportion of the ferroalloys used in the United States are imported, since, although there is a duty, local manufacturers do not supply the whole demand. This is true of about one-half of the ferromanganese and one-half of the ferrosilicon used in the United States, as well as a large part of the ferro-tungsten. More ferrotitanium and ferrovanadium are

manufactured here than abroad. Our ferrochrome production just about supplies the local demand.

In Europe the industry of manufacturing ferroalloys in the electric furnace is in excellent condition commercially, with the demand for alloys steadily increasing. Because of the large navies built by European countries there has been a great demand for ferrochrome. The sale in Europe of ferroalloys, especially ferrosilicon and ferrochrome, is accomplished by the various plants combining in a syndicate, with each plant receiving a portion of the total market demand, according to arrangement. [The original paper deals in detail with the electrolytic production of aluminum, copper and zinc.]

PIG IRON FROM THE ELECTRIC FURNACE

The electric furnace for smelting iron ore is of advantage only in localities where charcoal and coke are expensive and electric power is cheap. In the manufacture of pig iron the electric furnace consumes one-third of the carbon used by the blast furnace, and hence its use may be advantageous where coking coal is scarce and charcoal expensive. In considering the electric smelting of iron ores with regard to its commercial status at the present time it must be remembered that by reason of the cheapness of water haulage the electric furnace is in this case competing directly with the blast-furnace product, regardless of its location. The situation is not like that of the aluminum or ferroalloy industry, in which the electric furnace has the field to itself, because of its technical and commercial superiority over any combustion process. Hence, in proportion to the amount of pig iron produced we cannot expect to show nearly as large a rate of increase for the electric-furnace process as in the case of aluminum and ferroalloys.

That the electric furnace has been successful in the smelting of iron ores in those districts which present favorable conditions is shown by the fact that ten furnaces of the Trollhättan type and one of the Helfenstein type, with a total power capacity of about 40,000 hp., are in operation in Sweden. In this country there is one electric-furnace pig-iron plant of two furnaces with a total capacity of about 7000 hp., at Heroult, Cal. The California furnaces are of the rectangular type. While the electric smelting of iron ore has been technically successful at Heroult, it does not appear to have been as profitable as in Sweden, by reason of the cost of reduction with charcoal or coke. Although the electric furnace uses only one-third as much coke or charcoal as the blast-furnace, yet on the Pacific Coast of the United States all solid reducing agents are so scarce and expensive that this appears to be the great problem of electric as well as of blast-furnace smelting of iron ores. Attempts to use oil have not yet proved successful.

While advances in electric smelting of iron ore have been satisfactory, considering that its field of use is limited, the actual tonnage capacity of electric pig-iron furnaces is small. The total capacity in power consumption of the electric iron-smelting furnaces thus far erected in this country is 47,000 hp., which would produce about the same amount of pig iron per day as one modern blast furnace of 450 tons output per 24 hr.

STEEL FROM THE ELECTRIC FURNACE

In 1904 only four electric furnaces were running in Europe for the manufacture of steel. To-day there are 114 electric furnaces producing steel in Europe and the United States, and 30 others are in course of construction. As in other electrothermic processes, development has not been so rapid in the United States as in Europe. Only fourteen furnaces are in this country. The aver-

*From a paper, "Electrometallurgical Industries as Possible Consumers of Electric Power," to be presented at the meeting of the American Institute of Mining Engineers, San Francisco, Cal., in September.

capacity per charge of the furnaces already built is 4.7 tons, whereas that of the furnaces under construction is 4.5 tons, an increase of 21.6 per cent. The total charge capacity of the furnaces now installed is about 60 tons per charge, and the total charge capacity of the furnaces under construction will be 170 tons per charge. The six furnaces vary in capacity from 1 to 15 tons and require from 200 to 1500 kw. for operation.

Heroult furnace of 25 tons capacity, requiring 3000 kw., is nearly completed at Brückhausen, Germany. The induction furnaces vary in capacity from 1 to 10 tons and require from 165 to 600 kw. for operation. Of the 114 furnaces in operation, eighty-four are arc furnaces and thirty are induction furnaces; of the thirty under construction, twenty-six are arc furnaces and four induction furnaces.

Germany leads all countries in the steady growth of the process and the total tonnage produced. Although in Germany the production of electric-furnace steel increased 67.8 per cent in 1911, in the United States it decreased 44.2 per cent. The decrease in this country was probably due to the conservatism of American steel makers, which has prevented the wide adoption of the process before experimental results had conclusively proved its merits. From present indications there will be a considerable increase in the production of electric-furnace steel in this country in the near future. The large production of steel in the United States and Germany, in proportion to the number of furnaces operating, is due to the use of molten Bessemer and open-hearth steel, instead of cold scrap. The use of the latter almost entirely accounts for the comparatively small tonnage produced by France in proportion to the number of furnaces in operation. It is probable that at least 10,000 tons of electric-furnace steel is manufactured annually in England. It is estimated that about twelve furnaces operate there, several of which receive hot-metal charges. Italy, Norway, Switzerland, Belgium and Russia produce small tonnages also.

In the first years of its development the electric-furnace process was considered as a competitor of the crucible process only, for making high-class steel from scrap iron and scrap steel; but with the successful operation of larger furnaces the electric process is likely to become an important adjunct to the Bessemer and open-hearth processes as a means of super-refining their molten products. The electric process, however, does not appear to be destined to supersede either of these methods, since greater efficiency and economy are obtained by a combination of any two of the three processes as a duplex process. The success of the recent experiments has obtained for the electric process a definite place as a super-refining method. In time, preliminary refining will probably be done mainly in the Bessemer converter, the process being finished in the electric furnace, or the open-hearth. In Europe the electric-furnace process for making steel of the highest grade is rapidly superseding the old crucible method, because of its greater economy of operation and the possibility of using materials of lower grade.

ELECTRIC PIG-IRON PRODUCTION IN THE WEST

Raw Materials and Labor.—The raw materials necessary are iron ore, limestone and charcoal or coke. The electric furnace will handle either hematite or magnetite. In regard to the limestone, it is sometimes considered advisable to calcine the limestone before use in the electric furnace, in order to save the energy necessary to remove the carbon dioxide from the limestone in calcination; but the use of calcined limestone is not advisable because of the fine material added to the charge in this way. Charcoal is preferable to coke in the electric-furnace manufacture of pig iron, because the energy consumption is smaller (because of the possibility of using the shaft type of furnace with charcoal), and operation more steady. Coke can be used, however, in the rectangular type of furnace without a high shaft.

Iron ore of good grade is more or less plentiful throughout the Western States, but unfortunately the cost of transporting it to a point where it could be utilized might prohibit its use. Moreover, it is esti-

mated that Chinese iron ore containing 60 per cent of iron can be now laid down at Pacific Coast ports at a cost of about \$5 per ton. Such being the case we will assume that the cost of iron ore would be \$5. Limestone deposits are also more or less abundant throughout the West, and so the cost of lime as a flux in the production of pig iron would probably not be prohibitive.

At the starting of a plant charcoal would be the preferable material, but if the plant assumed great proportions, say requiring much over 100 tons of charcoal per day, we believe that it would be necessary to use coke, on account of possible scarcity of charcoal. For the purpose of this paper we will assume the cost of the reducing agent as not less than \$10 per gross ton, or \$3.33 for about one-third of a ton, required for reduction per ton of pig iron produced. Labor requirements are the same as in the blast-furnace manufacture of pig iron, and a minimum wage of \$2.50 per day of eight hours is assumed.

Power.—Power will be considered as costing at the furnaces \$11.70 per hp. yr., or 0.18c. per kw. hr., allowing for transformer losses in reducing the voltage to from 40 to 110 volts.

Cost of Production.—The following estimate is based upon an annual production of 50,000 tons of pig iron. The plant would consist of five electric furnaces of 3000 hp. each, the whole plant requiring 18,000 hp., including 500 hp. for various uses outside of the furnaces.

Estimated Cost per Gross Ton of Producing Pig Iron in the Electric Furnace, with Conditions as Above Stated

1.6 tons of iron ore at \$5 per gross ton.....	\$8.00
0.33 gross ton of charcoal or coke at \$10.....	3.33
0.25 gross ton of limestone at \$1.75.....	0.44
10 lb. carbon electrodes at 5c.....	0.50
2,400 kw.-hr. at 0.18c.....	4.32
Labor.....	5.00
Maintenance and repairs.....	0.50
Amortization, depreciation, at 5 per cent each.....	1.70
Interest at 6 per cent.....	1.02
General.....	1.40
Total.....	\$26.21

Based upon the above estimate, the cost of producing pig iron by use of the electric furnace would be about \$26 per long ton. It would have to compete with iron brought from the East and with foreign iron.

Market.—The market for this pig iron manufactured in any of the intermountain or Pacific Coast States would largely be a local one. At the present time this market would probably not be very great, since the fact that with pig iron selling on the coast at from \$20 to \$25 per ton there is little incentive to use it in foundry work when scrap iron can be purchased at a much lower price. There is no large steel plant on the coast which would be a consumer of pig iron. Of course, with a production cost f.o.b. Pacific Coast point of \$26 per gross ton, little if any profit could be made on pig iron produced there, as the price ranges nearer \$21 than \$25 per ton f.o.b. San Francisco.

Another important factor lies in the cheapness with which pig iron from England, China and India can be laid down upon the Pacific Coast. Pig iron from any of these countries could be delivered at Pacific Coast ports for from \$18 to \$20 per gross ton. With the Panama Canal open it is now possible to lay Eastern pig iron down on the Pacific Coast for about \$18 per long ton, so that the foreign or Eastern producer could considerably undersell the Western manufacturer.

To assure commercial success the plant should be able to sell its product in the coast market, if necessary, at as low a figure as \$18 per ton. Eastern or foreign pig iron can be laid down at that cost. It is also quite likely that the market for pig iron, with the price as high as \$20 per ton, will not grow very rapidly, as it is cheaper to use scrap iron to make castings.

ELECTRIC STEEL PRODUCTION IN THE WEST

There are two forms of steel manufacture in which the electric furnace has been used: (1) cold scrap iron and steel of either inferior or high-grade quality are melted and refined in an electric furnace with the production of steel of the highest grade and equal to the best crucible steel, and (2) molten steel, the product of either the acid or basic converter, or of the acid or basic

open-hearth furnace, is super-refined, or made into alloy steel, in an electric furnace. The steels thus made may be cast into ingots or directly into various shapes. It has been proposed to use the electric furnace for the manufacture of steel from molten pig iron; but with pig iron at \$20 per ton the cost would be prohibitive. Steel made from molten electric-furnace pig iron would cost at least \$34 and probably over \$40, while that made out of Eastern pig iron, which would have to be melted, would cost at least \$30 and probably \$35, and so could not compete with Eastern steel, which can be sold in the West for about \$30.

As the high cost of pig iron prohibits the establishment of a tonnage steel plant, we will consider only an electric-furnace plant for the production of high-grade steel castings and shapes, and bar steel.

Raw Materials and Labor.—The principal raw material used in the electric-furnace manufacture of steel is scrap steel. While some scrap cast iron could be used, most of the material melted should be steel or wrought iron. Iron turnings, which in the open hearth are not especially desirable on account of oxidation losses, are about the most adaptable material for use in the electric furnace. There is not the high oxidation loss in the electric furnace that there is in the open-hearth. Any scrap material used in the electric furnace must be small in size because of difficulty in operation of a furnace on large scrap iron, due to short circuits. A large part of the turnings produced in the various foundries and shops throughout the West go to waste at present and could be obtained cheaply.

Power.—In the electric-furnace manufacture of steel electric energy is used at about the same voltage as in the production of pig iron or ferroalloys; but the electric steel furnace cannot maintain as high a load factor as the electric iron-smelting furnace or the ferroalloy furnace. For example, if it be necessary to transform an 11,000-volt current down to 40 or 100 volts, a transformer and line loss of 5 per cent will occur. This, on the basis of 100 per cent load factor and with power at \$10 per hp. yr., would make the power cost \$10.52 at the furnace. Owing to the intermittent nature of the electric furnace process in steel manufacture a load factor of over 80 per cent could be maintained only with difficulty. The power cost would then be \$13.15, or 0.20c. per kw. hr. If a lower rate were made on such power an electric steel furnace could use peak power to advantage on account of the intermittent nature of the process.

Cost of production.—The following estimated cost of production of electric-furnace steel is based upon an annual production of 25,000 tons and the utilization of 4000 hp. There are so many combinations of furnaces of different sizes with which a plant could be equipped that we will not attempt to specify them. The estimate is based upon steel cast into ingot form.

Cost of Production of Steel in the Electric Furnace in the Western United States

1.1 tons of scrap at \$15 per ton.....	\$16.50
Slag materials	1.00
Ferroalloys	1.00
800 kw-hr. at 0.20c.....	1.60
Labor	2.50
Maintenance and repairs.....	2.40
20 lb. of electrodes at 5c.....	1.00
Amortization and depreciation at 5 per cent each	1.50
Interest at 6 per cent.....	0.90
General	1.00
Royalty	0.50
Total	\$29.90

With conditions as above stated, the cost of production of ingot steel in the electric furnace would be about \$30 per long ton, to which would have to be added the freight rates to the point of market or delivery.

Market.—There is very little market for billet and ingot steel on the Pacific Coast, and at the present time a tonnage steel plant manufacturing ingots for rails and heavy steel would probably not be able to compete in the market with Eastern or foreign products. But there is a considerable demand for small shapes; and a plant in the West casting steel into such shapes might possibly be able to dispose of its product; but a large part of the steel shapes used in the West belongs to machinery manufactured in the East, and most of this steel comes from the Eastern States.

GENERAL CONCLUSIONS

1. The market for hydroelectric power for electrometallurgical industries in general is not great; and under the best of conditions the part consumed in electrometallurgical plants would be a very small proportion of the total hydroelectric power that it is possible to develop in the Western States.

2. Although the outlook at the present time is not favorable to the establishment of extensive electrometallurgical industries, we are nevertheless of the opinion that such industries will, in time, be established, but perhaps along other lines than at present, that is, other than the production of aluminum, ferroalloys, pig iron, steel, etc. It is also doubtless true that the electric furnace will in time be quite generally used for the local production of steel castings, but an extensive use of the electric furnace for this purpose will not involve any great consumption of electric power.

Therefore, if our analysis of the situation be correct, it is reasonable to expect that the hydroelectric power companies may ultimately be able to dispose of a great portion of their surplus power by reason of the development of new electro-metallurgical industries. We believe they will, and for this reason:

At the present time the metallurgy of the non-ferrous metals is rapidly changing. The processes which were suited to the treatment of non-ferrous ores five or ten years ago are at the present time not satisfactory, because the non-ferrous metallurgical plants of the country are called upon to treat ores of a lower grade, and also more complex than formerly. Such being the case, processes must be devised which will meet these requirements. However, we do not for a moment imagine that electrothermic or electrolytic processes will prove to be the only solution of the many problems which are at the present time confronting the non-ferrous metallurgist. Although such processes may greatly assist in solving these problems, we are of the opinion that further research work will indicate other solutions. This is true, especially as regards hydrometallurgical processes, because the profitable treatment of the low-grade and complex ores above mentioned requires the use of cheap reagents. Such being the case, the hydrometallurgical treatment of such ores may bring about the establishment of an electrochemical industry for the production of the necessary reagents and thus indirectly the metallurgical industry may bring about an extended use of hydroelectric power. Whether this will prove to be the case or not, remains to be seen. It can only be determined by a careful investigation of the subject, and by extensive research, having for its object the finding of new uses for electricity in metallurgical work.

Strength of Concrete-Filled Pipe Columns

In order to determine whether a column, made by filling a steel pipe with concrete, was perfectly elastic under the lower loads, whether it had a definite elastic limit, and, if such proved to be the case, to determine the stress in the concrete and in the steel at this load, F. W. Swain and A. F. Holmes described the results of such tests in a paper, "An Investigation of the Strength and Elastic Properties of Concrete-Filled Pipe Columns," presented at the eighteenth annual meeting of the American Society for Treating Materials, at Atlantic City, June 22 to 26. In substance the authors stated that tests made on concrete-filled pipe columns, filled by the jolting process, showed the columns to have a definite elastic limit and up to this load to be perfectly elastic, the steel pipe preventing permanent set from taking place in the inclosed concrete.

The concrete blocks made by this process were also found to have an elastic limit, although permanent set was found at the lowest loads.

The column loads at the elastic limit were distributed between the concrete and the steel, and it was found that the former checked almost exactly the stress at the elastic limit obtained by testing the blocks of plain concrete.

The results of these tests would indicate that a load of 25 per cent of the ultimate could be taken as a safe working load, which conforms very closely with the present practice.

Similar tests on larger columns are needed to complete this series and especially tests on columns containing a steel core.

Special Bar Cutting-Off Machine

For cutting off all sizes of round vanadium and special alloy steel bars and shafting the Brightman Mfg. Company, Columbus, Ohio, has brought out a special type of machine. The machine is built for heavy rolling mill work and weighs approximately 1,000 lb. Special apparatus for backing the tools cut by power at the completion of the cut is included in the equipment, and other features upon which emphasis is placed are the cutting of short pieces from both ends of a long bar, as well as the cutting of short pieces into thin disks. The machine is driven by a 20-hp. motor and will cut a piece of 3-in. round material in 40 to 50 seconds.

The machine is equipped with two universal trucks and a double cutting head, one on each end. The use of the double cutting head enables pieces ranging from $\frac{1}{4}$ to $\frac{1}{2}$ in. in length to be cut off both ends of long bars rapidly. When this class of work is being handled the bars are put in the machine and one end is cut off by one of the heads, after which the bar is pulled through the machine and the other cutting head removes the stock from the other end of the bar, thus eliminating the necessity of taking the bar out of the machine and turning it end for end. The use of the double cutting head enables two thin pieces, such as gear blanks, etc., to be cut simultaneously from a short piece of stock. A measuring gage for short lengths, which is attached to one end and is intended to be used on shell and shrapnel work, as well as on short pieces of every description, forms a part of the equipment of the machine.

At the completion of the cut the four tools are backed out quickly under power by a special mechanism. An automatic stop is provided for throwing the tools out at the end of the cut. A rotary pump is used to supply cutting lubricant to the cutters, its source of supply being a receptacle in the base, to which the used lubricant drains and is freed from chips.

When long bars are being cut two specially designed stands are used, which, it is pointed out, permit the stock to revolve on the stands while being cut off. A cam-operated roll is provided for the stands to place the bar in position to be pushed through the machine without any drag.



A Special Machine for Cutting Off 1 to 6-In. Round Vanadium and Special Alloy Steel Bars for Shell, Shrapnel and Shafting Work

A New Type of Factory Lift Truck

A new factory lift truck has been put on the market by the Columbus Lift-Truck Company, Columbus, Ohio. It is an invention of F. H. Angell, president of the company, and who was formerly a department head in the plant of the Jeffrey Mfg. Company.

The novel feature of this truck is its lifting mechanism for raising the freight platform from the floor. This is accomplished by four levers, two



A Recently Designed Factory Lift Truck Which Is Equipped with an Interesting Platform Lifting Mechanism

of these being located at each end of the truck. Each lever is pivoted to the truck frame and the ends of these levers are raised by an eccentric or cam, which is rotatable manually by a lever shown at the front end of the truck frame. When this hand lever is raised to a vertical position the four levers are raised by the eccentric, and when the hand lever is restored to a horizontal position the load is lowered so that the platform side supports rest on the floor, thus allowing the truck to be withdrawn. The lifting parts of the truck are of high carbon steel, and the frame is malleable and cast iron and braced with angle iron. The extension, or lifting lever, is of malleable iron and works clear of the load and is not connected with the tongue.

The truck is made in three different sizes, ranging from 1000 lb. capacity to 2500 lb. The standard size, which measures 24 x 40 in., is fitted with 10-in. wheels. Hyatt roller bearings are used to reduce friction in moving a heavy load. The latest type standard truck is also made with a body, or frame 70 in. long, if desired.

Natural Gas in the Appalachian Region

The marketed production of natural gas in New York, Pennsylvania, West Virginia, Ohio and Kentucky in 1914 amounted to 425,871,728 thousand cubic feet, having a total value at the point of consumption of \$73,677,641, or an average value of 17.3c. per thousand cubic feet, according to statistics compiled under the supervision of J. D. Northrop of the United States Geological Survey. Compared with 1913 the output of natural gas credited to these states shows a slight increase, amounting to 608,480 thousand cubic feet, whereas the value of the production shows a substantial gain, amounting to \$4,359,537, or a 6 per cent increase. The gain in output is credited chiefly to Ohio, and New York gained slightly, the increase being more than sufficient to offset declines in Pennsylvania, West Virginia and Kentucky. The increased output of Ohio is credited chiefly to Cuyahoga County, where a gas field of considerable importance was developed in Cleveland and its suburbs as the result of discoveries made late in 1913.

CANADA'S REDUCED IMPORTS

A Marked Decline in Imports of Iron, Steel and Machinery

TORONTO, Aug. 5, 1915.—The business depression through which Canada has been passing for the last twelve months is reflected in its import trade for the fiscal year 1915, the preliminary figures just issued by the Department of Trade and Commerce showing a decline of 26.35 per cent in merchandise imported for home consumption. The total value of the merchandise imported was \$455,371,371, compared with \$618,328,874 the previous year. This is the smallest since 1911.

Although the import trade with the United States has shared in the decline, there are two significant facts in regard thereto. One is that the decline in the imports from the United States is scarcely as large as that of the grand total from all countries. The other is that the relative proportion of the merchandise imported from the United States is larger than in the preceding year.

The value of the merchandise imported from the United States last year is placed at \$296,632,506. This is a decrease of 25 per cent as compared with the fiscal year 1914, but it is 1.35 per cent less than the decrease in the grand total. Imports from Great Britain, on the other hand, declined 31.72 per cent.

Now as to the relative proportion that imports of merchandise from the United States bore to the total from all countries. For some years there has been a steady, though slight, increase in this proportion, and last year, in spite of a marked decline in the total, the imports from the United States were 65.11 per cent of the whole. This is by a fraction the highest percentage on record. For the preceding year the proportion was 63.97 per cent.

A STRIKING DECLINE

The most striking decline in Canada's import trade was in that which comes under the broad classification of "metals, minerals, and manufactures of." In view of the great curtailment that has taken place in railroad construction and building operations generally, nothing else could have been expected. But the results are none the less striking, and particularly when we begin to analyze the figures.

Under the classification of "metals, minerals, and manufactures of" the decline in the total import trade was 56.9 per cent compared with the fiscal year 1914. And while the decline in the imports from the United States was 69.42 per cent, yet in spite of this we are presented with the singular fact that the relative proportion obtained from your country was even larger than in the preceding year, it being 84.73 per cent compared with 81 per cent. The total value of the "metals, minerals and manufactures of" imported from all countries was \$148,282,870 in 1914 and \$84,365,978 in 1915. In the former year \$121,250,946 came from the United States and in the latter \$81,567,725.

In an analysis of the figures under the classification "iron, steel, and manufactures of" similarly striking results are obtained. Under this classification the total imports in 1915 from all countries were \$64,758,853 and in 1914, \$119,221,241, showing a decline for the past year of 45.67 per cent. From the United States the imports were \$55,421,360 and \$98,695,313 respectively, a decrease of 43.84 per cent. In other words, the proportion which imports of "iron and steel and manufactures of" from the United States bore to the total from all countries was 82.78 per cent in 1914 and 85.58 in 1915.

It is quite evident that in the iron and steel trade, as in that appertaining to general merchandise, the relative position of the United States in the Canadian market is not a declining one.

IMPORTS FROM UNITED STATES COMPARED WITH TOTAL

The following table shows Canada's principal imports in 1915 from the United States under the classification of "metals, minerals, and manufactures of"; also the grand total from all countries:

	United States	From all countries
Electric motors, generators, dynamos and apparatus	\$5,137,382	\$6,445,400
Brass and manufactures of	2,621,786	2,948,410
Copper and manufactures of	3,506,052	3,506,052
Agricultural implements	1,533,755	1,595,580
Bar iron or steel	1,020,028	1,222,371
Castings, iron or steel	608,990	701,462
Cast-iron pipe	261,369	325,561
Chains	231,316	307,750
Cream separators	231,359	408,700
Cream separator materials	193,607	193,607
Cutlery	202,533	741,375
Skates	56,745	34,300
Boilers, steam	162,982	194,411
Engines, gasoline and gas	1,873,486	2,002,600
Engines, steam	170,117	237,340
Locomotives	158,777	162,427
Railroad cars, freight and passenger	658,148	678,730
Pumps, power	440,606	489,375
Engines and boilers, etc.	455,843	461,620
Fire extinguishing machines and sprinklers	101,531	101,940
Fittings for iron and steel pipes	710,398	729,440
Guns, rifles and revolvers	553,434	725,570
Builders', cabinet makers', saddlers' and carriage hardware	473,160	578,100
Pig iron	473,160	578,100
Iron or steel beams, shells, plates, etc.	320,422	726,240
Iron or steel bridges and parts	370,088	416,400
Iron or steel ingots, blooms, billets, etc.	252,041	267,040
Iron or steel rivets, nuts and bolts	215,240	252,040
Wire rods in coils, not over 3/4 in.	135,439	141,000
Iron or steel scrap	1,271,714	1,417,200
Iron or steel sheets	140,797	141,200
Iron or steel sheets No. 14 and under	443,899	718,000
Galvanized sheets	1,243,333	1,564,900
Locks of all kinds	819,178	2,016,600
Locomotive tires	201,432	215,300
Adding machines	123,668	214,600
Carding, spinning, knitting machinery, etc.	198,441	201,400
Coal-handling machinery	326,294	484,100
Cranes and derricks	136,581	141,400
Bookbinding machinery	338,235	364,700
Goldmining machinery	151,423	163,900
Mining, smelting and reducing machinery	182,388	182,600
Printing presses	447,597	465,300
Ore crushers, stamp mills, rock drills, etc.	555,028	572,400
Paper and pulp machinery	367,851	417,900
Portable engines	382,790	406,700
Rolling-mill machinery	691,120	712,400
Sawmill machinery	108,943	111,200
Shovels, steam and electric	137,148	139,400
Thrashing machine separators and parts	154,796	154,700
Type-casting and type-setting machines	514,639	617,900
Typewriters	478,941	479,700
Well-digging machinery	401,046	402,400
Nails and spikes	214,379	214,200
Iron ore	144,990	145,800
Rolled iron or steel beams, channels, angles, etc.	1,739,210	2,138,200
Rolled iron or steel hoop, band, scroll or strip	2,568,068	2,702,300
Rolled iron or steel plates or sheets	497,636	531,400
Skelp iron or steel for making pipe	1,189,288	1,297,300
Steel or iron for manufacture of milling cutters	2,113,583	2,114,100
Steel plate for manufacture of bridges, structural work and cars	635,622	1,009,400
Steel rails	641,575	646,900
Stoves of all kinds	704,468	708,400
Surgical and dental instruments	474,255	487,500
Switches, frogs and intersections	345,385	392,300
Hand tools, mechanics'	104,149	122,800
Tubing, iron and steel, all kinds	675,606	761,500
Granite ware	1,190,285	1,474,200
Hollow-ware of iron, nickel and aluminum	121,984	184,800
Barb wire	165,964	206,900
Galvanized wire, Nos. 9, 12 and 13	627,162	627,500
Wire, iron or steel, covered	1,281,757	1,306,900
Wire rope	174,552	238,100
Other wire of iron or steel	125,550	175,500
Tin plates and sheets	398,064	801,300
Tinware	2,581,116	3,022,400
Spelter	466,981	591,300
Alumina	577,170	711,900
Aluminum in blocks, ingots, etc.	501,807	501,900
Asbestos in manufactured form	402,845	480,100
Buckles of iron and steel, etc.	188,178	296,700
Gas, oil and electric fixtures	111,073	120,400
Lamps, lanterns and chandeliers	400,983	429,200
Nickel plated ware	611,268	1,020,200
Nickel, nickel silver and German silver in blocks, etc.	776,046	874,900
Ores of metal, n.e.s.	171,920	170,400
Gunpowder and explosives	469,578	469,900
Ships and ships' machinery	757,041	1,163,700
	695,725	742,700

UNITED STATES SUPPLIED 90½ PER CENT OF MACHINERY

The total value of machinery of all kinds imported from the United States was \$14,824,159, which was about 90½ per cent of the total from all countries. While this is a decrease of 43 per cent, compared with the previous year, when the imports from the United States were \$25,893,261, and from all countries \$28,127,549, yet the proportion of the former to the grand total was 1.65 per cent larger.

One of the most significant declines in Canada's imports was in railroad equipment. Taking freight and passenger cars, rails, locomotives, locomotive tires

switches, frogs and intersections, the total was only \$1,991,742, compared with \$13,754,831 in 1914, a decrease of 85.52 per cent. In cars alone in 1915 the value was \$7,375,285, and in rails \$4,922,795. The imports from the United States in the two years respectively were as follows: Freight and passenger cars, \$7,344,085 in 1914, and \$658,148 in 1915; rails, \$4,901,851 (\$704,468); locomotives, \$615,468 (\$158,777); locomotive tires, \$135,401 (\$123,668); switches, frogs and intersections, \$274,093 (\$104,149). The total from the United States for 1914 was \$13,270,898, and for 1915, \$1,749,210, a decrease of 86.81 per cent. But in spite of this decline it will be seen at a glance that of the total imports of railroad equipment nearly 90 per cent came from the United States. Since the war broke out, and the requirements of the home market have been curtailed, Canada has become an exporter of both rails and freight cars. Rails have been going to the United States, Europe and Australia and freight cars to Russia and France.

Another marked decline was in the imports of such structural materials as beams, angles, ties, channels, and plates. In five classifications there was a total decline of \$9,463,000, the total from all countries being \$4,577,481 compared with \$14,040,923 in 1914. The imports from the United States in the two respective years were \$4,398,931 and \$12,209,573, or 96 per cent of the whole in the one instance and nearly 87 per cent in the other.

On account of so many plants in Great Britain being turned from their regular vocation to the manufacturing of munitions of war of various kinds, to say nothing of Germany ceasing to be a source of supply, Canada will no doubt be a larger importer from the United States of cutlery, and many lines of hardware which were formerly obtained in the European markets.

PRINCIPAL DECREASES AND INCREASES

The amounts by which Canada's imports from the United States declined in the last fiscal year in most of the principal items are as follows: Copper and manufactures of, \$2,804,696; agricultural implements, \$1,664,508; electrical apparatus, \$2,367,862; bar iron or steel, \$2,078,873; castings of iron or steel, \$652,353; cast-iron pipe, \$309,435; chains, \$268,394; steam boilers, \$110,101; gasoline and gas engines, \$583,021; steam engines, \$216,327; locomotives, \$456,691; engines and boilers, other than above specified, \$44,737; fire-extinguishing machines and sprinklers, \$12,885; fittings of iron and steel, \$286,884; guns, rifles, revolvers, \$57,815; builders', saddlers', carriage hardware, etc., \$320,958; pig iron, \$1,720,985; iron and steel beams, sheets, plates, angles, etc., \$174,759; iron or steel bridges, \$662,614; iron or steel ingots, etc., \$464,757; iron or steel nuts, rivets, bolts, etc., \$122,934; wire rods, \$192,652; Canada plates, Russian iron, etc., \$454,425; iron or steel sheets, No. 14 and thinner, \$629,005; galvanized sheets, \$199,458; locks of all kinds, \$235,238; carding, spinning and weaving machinery, \$830,515; cranes and derricks, \$443,952; book-binding machinery, \$185,430; sawmill machinery, \$91,677; paper and pulp machinery, \$39,917; mining, smelting, and reducing machinery, \$494,078; ore crushers, drills, etc., \$113,343; portable engines and boilers, \$1,692,528; printing and lithographic presses, \$322,089; steam and electric shovels, \$421,606; threshing machine separators, \$624,256; type-casting and type-setting machines, \$226,652; nails and spikes, \$123,810; rolled iron or steel angles, tees, beams, girders, etc., \$4,887,623; rolled iron or steel hoop, band, scroll or strip, \$294,562; rolled iron and steel plates, \$2,117,972; skelp iron or steel, \$628,236; steel plates for bridge manufacturing, \$825,047; steel rails, \$4,197,383; stoves, \$245,485; mechanics' hand tools, \$412,774; tubing, iron and steel, all kinds, \$2,284,654; tin plates, \$277,945; gas, oil and electric fixtures, \$236,202; lamps, lanterns and chandeliers, \$261,557; cutlery, \$43,948.

The increases in Canada's imports of iron, steel, minerals, and manufactures of, from the United States were few indeed. The principal increases were: Power pumps, \$136,111; well-digging machinery, \$187,250; barbed wire, \$123,961; galvanized wire, \$62,247; spelter,

\$246,673; aluminum in ingots, \$7,000. The increase in the importation of wire and spelter is no doubt due to the demand on war account.

THE OUTLOOK

That the fiscal year 1916 upon which Canada has entered will witness a return to a more normal condition of trade there can scarcely be any doubt. Everything at the moment points in that direction. The acreage under wheat is 26 per cent larger than that from which the crop was reaped last year. In oats the gain is 16 per cent, while the condition of all grain is above the average. The financial situation is gradually improving, and the banks are in a more than usually favorable position to provide the funds necessary to move the crops when harvest begins in the West. We shall probably, however, see but few new undertakings in railroad construction or in industrial enterprises, although should further large orders come forward for munitions of war many manufacturers will find it necessary to increase their equipment. W. L. E.

RETORT COKE ONE-THIRD

By-Product Production in 1914 Reaches a New High Percentage

The United States Geological Survey's statistics on coke in 1914 show that the total output in the United States was 34,555,914 net tons, valued at \$88,334,217. Of this 23,335,971 tons was made in beehive ovens, with an almost total loss of the by-products, and 11,219,943 tons or 32.5 per cent was produced in by-product ovens, with a recovery of over \$17,500,000 worth of by-products, or approximately \$1.55 for each ton of coke. As over 23,000,000 tons of beehive coke was made in 1914, and as the yield of coal in coke is less in beehive ovens than in by-product ovens, the loss of by-products from coal made into coke in the beehive ovens in 1914 is put at not less than \$40,000,000. The slump in copper and other base metal smelting following the declaration of war last August was responsible for a marked decrease in the coke production in the Rocky Mountain States.

Compared with 1913 the decrease in coke output was 11,743,616 tons, or 25 per cent in quantity, and \$40,588,056, or 31.5 per cent in value. The beehive and by-product coke did not suffer equally in the decrease, the former falling off 10,248,859 tons, or 30.5 per cent in quantity, and \$30,030,371, or 37 per cent in value, as compared with a decrease in by-product coke of 1,494,757 tons, or 11.8 per cent in quantity, and \$10,557,685, or 22 per cent in value.

Three States, Kentucky, Ohio and Washington, showed increases. These increases were all due to the operation of by-product plants, the building of which was begun in 1912 and 1913. At the end of 1914 there were 99,755 ovens in the United States, of which 5809 were by-product ovens and 93,946 were beehive. Of the by-product ovens 667, or 11.5 per cent, were idle throughout the year, and 44,450, or 47.3 per cent of the beehive ovens were idle. At the end of 1914 there were under construction 644 new by-product ovens and 605 new beehive ovens. In the year seventy-one by-product ovens were abandoned, all of which it is expected will be replaced by others of the retort or distillation type, and 3603 beehive ovens were also abandoned.

The following table gives the output of coke in the United States in 1914 by States:

Production of Coke in the United States in 1914, by States			
	Net Tons		Net Tons
Alabama	3,084,149	Virginia	780,984
Colorado	666,083	Washington	84,923
Georgia	24,517	West Virginia	1,427,962
Illinois	1,425,168	Maryland	
Indiana	2,276,652	Massachusetts	
Kentucky	443,959	Michigan	2,222,134
New Jersey	255,283	Minnesota	
New Mexico	362,572	Utah	
New York	457,370	Wisconsin	
Ohio	521,635		
Pennsylvania	20,258,393	Total	34,555,914
Tennessee	264,127		

Death of George G. McMurtry

George Gibson McMurtry, chairman of the American Sheet & Tin Plate Company for some years, for a much longer period a leading manufacturer of sheets, and founder of the town of Vandergrift, Pa., died suddenly Aug. 5 at Atlantic City, N. J., aged 77 years. He was born in Belfast, Ireland, May 28, 1838. At an early age he came with his parents to this country. The son's first business experience was at Detroit. Later he was employed in the Chicago office of Jones & Laughlin. Going to Pittsburgh he was employed by James Wood & Co. and after a few years entered the service of Jones & Laughlin, as the present Jones & Laughlin Steel Company was then known. He was a warm friend of B. F. Jones, Sr., head of that company for many years. For a time in the eighties Mr. McMurtry was engaged in the nut and bolt business, the firm name being Charles & McMurtry. Later he was connected with the Volta Iron Company, Ltd., Apollo, Pa., out of which grew the Volta Galvanizing Works. The plant of the latter was at Twelfth and Pike streets, Pittsburgh, and the company bought black sheets from the Volta Iron Company and galvanized them.

In 1885 Mr. McMurtry founded the Apollo Iron & Steel Company, which acquired the Volta Iron Works puddling mill and sheet plant at Apollo, Pa., and built two 15-ton open-hearth furnaces. It was very successful from the start. Owing to labor troubles, which Mr. McMurtry deplored, he conceived the idea of establishing operations on a larger scale and of building up a separate community. He therefore reorganized the Apollo Iron & Steel Company and built new sheet mills at Vandergrift, Pa. At that time the Vandergrift plant was the largest single sheet mill in the country and it still enjoys that distinction. Mr. McMurtry was the father of Vandergrift, widely known as a model town, and has often been referred to as "the workman's paradise." He gave years of hard labor to the development of this town, and while at first the venture was looked upon with skepticism he pushed steadily ahead and to-day it is known the world over as embodying the most advanced methods found in such communities.

Vandergrift is located a few miles below Apollo on the Kiskiminetas River. The original tract comprised 640 acres of farm land. Ground was broken for the new town in June, 1895. In THE IRON AGE of Nov. 21, 1901, a description of Vandergrift and the Vandergrift plan appeared. The town then had over 6000 inhabitants and it was a matter of comment that hardly a dozen residents at that time were over 50 years of age. The workmen were largely natives of the locality, sons of farmers or workmen in nearby towns. In developing the Vandergrift idea Mr. McMurtry visited many of the famous workmen's towns in Europe. His ac-

quaintance with the iron and steel masters of Europe, fostered by this and other frequent visits, resulted in many warm friendships which were of small factor in establishing friendly relations between American steel manufacturers on the one hand and British and Continental steel men on the other on the visit of the latter to this country as guests of the American Iron and Steel Institute in the fall of 1910. Mr. McMurtry had been a member of the Iron and Steel Institute (British) since 1889. He was a charter member of the American Iron and Steel Institute, but due to his unusual aversion to publicity neither portrait nor biographical sketch of him appears in the institute's biographical directory.

When the American Sheet Steel Company was formed in April, 1900, Mr. McMurtry, owing to his prominence in the sheet trade, was made its president. The American Sheet Steel Company and the American Tin Plate Company were merged in the American Sheet & Tin Plate Company in January, 1904. Mr. McMurtry was made chairman of the board of the larger company and removed from Pittsburgh to New York City. This was largely that the directors of the United States Steel Corporation might have his services as an advisor, and he became a member of the corporation's advisory board. After he left Pittsburgh Mr. McMurtry continued to take a deep interest in the town of Vandergrift, which was very close to his heart, and when he returned to Pittsburgh on business trips he always made it a point to go to Vandergrift if possible and renew his friendship with his hundreds of acquaintances there. When he left for New York residents of Vandergrift held a public meeting in the town hall and presented him with a silver loving cup. In appreciation



Campbell Studio, New York
GEORGE G. MCMURTRY

of this gift, which he probably prized more highly than any other material possession, Mr. McMurtry presented each church in Vandergrift with a pipe organ.

Mr. McMurtry leaves his widow and three sons, all of New York. One son, Dr. Woods McMurtry, died a little more than a year ago in New York City.

It was the pleasure of the writer to have been acquainted with Mr. McMurtry for nearly thirty years, first meeting him when he was connected with the Volta Iron Works. His splendid qualities quickly and strongly impressed themselves upon all whom he honored with his friendship. He was never too busy to give a helping hand or moral or business counsel to any man who showed worth and sincerity of purpose. He had hundreds of friends in Pittsburgh, who regarded him as an ideal man. But with all his influence he was one of the most modest of men. He hated meanness and unfairness and was the soul of honor and consideration in all his dealings. He believed that every man will develop good qualities if the proper means are taken to bring them out. Many of the employees of the

Volta Company swear by the friendship of Mr. McMurtry and regard it as one of their most precious possessions. The regard in which he was held by employees was shared also by their children. The world is better for having had George G. McMurtry in it, and it has suffered a great loss in his death.

ROBERT A. WALKER.

STEEL PRODUCTION IN 1914

United States Production of Steel Ingots and Finished Forms of Iron and Steel

Special Statistical Bulletin No. 4, issued by the Bureau of Statistics of the American Iron and Steel Institute, has been received from William G. Gray, statistician in charge.

The total production of all kinds of steel ingots and castings in 1914 was 23,513,030 gross tons, against 31,300,874 tons in 1913, which was the year of maximum production. The decrease was 7,787,844 tons, or 25 per cent. The steel production of 1914 consisted of 22,819,784 tons of ingots and 693,246 tons of castings, against 30,280,130 tons of ingots and 1,020,744 tons of castings in 1913. The following tables show the annual production by processes from 1900 to 1914 inclusive:

PRODUCTION OF STEEL INGOTS AND CASTINGS.

PRODUCTION OF STEEL INGOTS AND CASTINGS BY PROCESSES, GROSS TONS, 1900-1914.

Year	Open-hearth.			Bessemer.	Crucible.	Electric.	Miscellaneous.	Total Gross tons.
	Basic.	Acid.	Total.					
1900	2,545,091	853,044	3,398,135	6,084,770	100,562	.....	4,862	10,188,329
1901	3,618,903	1,037,316	4,656,209	8,713,302	98,513	.....	5,471	13,473,595
1902	4,406,533	1,191,196	5,597,729	9,138,363	112,772	.....	8,386	14,947,250
1903	4,734,913	1,094,998	5,829,911	8,592,829	102,434	.....	9,804	14,534,978
1904	5,106,367	801,799	5,908,166	7,359,140	83,391	.....	9,190	13,859,887
1905	7,815,728	1,155,648	8,971,376	10,941,376	102,233	.....	8,903	20,023,947
1906	9,658,760	1,321,653	10,980,413	12,275,830	127,513	.....	14,380	23,398,136
1907	10,279,315	1,270,421	11,549,736	11,667,549	131,234	.....	14,075	23,362,594
1908	7,140,425	696,304	7,836,729	6,116,755	63,631	.....	6,132	14,023,247
1909	13,417,472	1,076,464	14,493,936	9,330,783	107,355	13,762	9,185	23,955,021
1910	15,292,329	1,212,180	16,504,509	9,412,772	122,303	52,141	3,194	26,094,919
1911	14,645,932	912,718	15,558,650	7,947,854	97,653	29,105	2,844	23,676,106
1912	19,641,502	1,139,221	20,780,723	10,327,901	121,517	18,309	2,853	31,251,303
1913	30,344,026	1,255,305	31,599,331	9,545,706	121,226	30,180	3,831	31,300,574
1914	16,271,129	903,555	17,174,684	6,220,846	89,869	24,009	3,622	23,513,030

PRODUCTION OF STEEL INGOTS, 1900-1914.

1900	2,502,447	718,197	3,220,644	6,078,303	96,573	.....	6	9,995,526
1901	3,524,052	830,635	4,354,687	8,706,538	94,586	.....	214	13,156,025
1902	4,384,129	935,721	5,319,850	9,125,815	107,817	.....	2,833	14,556,315
1903	4,600,034	829,529	5,429,563	8,574,730	97,025	.....	3,395	14,104,713
1904	5,007,448	597,884	5,605,332	7,843,089	79,083	.....	2,172	13,529,676
1905	7,609,569	835,267	8,444,836	10,919,272	96,500	.....	2,572	19,463,180
1906	9,545,212	915,310	10,460,522	12,243,229	117,170	.....	3,510	22,624,431
1907	9,912,839	890,372	10,803,211	11,634,276	121,001	.....	989	22,559,477
1908	6,985,420	539,532	7,524,952	6,096,196	55,360	.....	519	13,677,027
1909	13,111,467	781,429	13,892,896	9,296,999	94,672	13,456	786	23,298,779
1910	14,858,353	782,805	15,641,158	9,354,437	107,671	50,821	.....	25,154,087
1911	14,419,306	608,153	15,027,459	7,890,753	83,623	27,227	417	23,029,479
1912	19,197,564	712,371	19,909,935	10,259,151	100,967	14,147	542	30,284,682
1913	30,844,465	805,250	31,649,715	9,465,200	103,655	20,973	557	30,280,130
1914	15,906,985	633,352	16,540,337	6,154,964	78,683	15,458	312	22,819,784

PRODUCTION OF STEEL CASTINGS, 1900-1914.

1900	42,644	134,847	177,491	6,467	3,969	.....	4,856	192,503
1901	94,941	206,681	301,622	6,764	3,927	.....	5,257	317,570
1902	112,404	255,475	367,879	12,548	4,955	.....	5,553	390,935
1903	134,879	265,409	400,348	18,099	5,409	.....	6,409	430,265
1904	98,919	203,915	302,834	16,051	4,308	.....	7,018	330,211
1905	236,129	320,381	556,510	22,103	5,733	.....	6,391	560,767
1906	313,545	406,343	719,891	32,601	10,343	.....	10,870	773,705
1907	399,476	380,040	779,516	33,273	10,233	.....	13,086	803,117
1908	155,065	156,772	311,777	20,559	8,271	.....	5,613	346,220
1909	396,683	295,035	691,718	33,814	12,663	306	8,399	656,242
1910	433,976	429,375	863,351	58,335	14,632	1,320	3,194	940,332
1911	266,626	304,565	571,191	57,101	14,030	1,878	2,427	646,627
1912	443,908	426,850	870,748	68,750	20,580	4,162	2,311	966,621
1913	460,161	430,065	890,216	80,506	17,571	9,207	3,244	1,020,744
1914	334,144	270,173	604,317	65,882	11,186	8,551	3,310	693,246

Included in the 16,271,129 tons of basic open-hearth steel ingots and castings produced in 1914 are 835,690

tons of duplex steel ingots and castings made from metal partly purified in Bessemer converters and finally purified in basic open-hearth steel furnaces, against 2,210,718 tons in 1913, a decrease of 1,375,028 tons, or 62.1 per cent.

The production of alloy-treated steel in 1914 was 646,953 tons, consisting of 577,107 tons of ingots and 69,846 tons of castings, against 714,357 tons in 1913, consisting of 625,430 tons of ingots and 88,927 tons of castings.

The following table shows the production of plates and sheets by kinds in 1914, compared with 1913:

Kinds	1913—Gross Tons		Steel	Total
	Iron	Steel		
Universal plates.....	1,565	1,156,851	1,158,416	
Sheared plates—				
Rolled on single stands.....	2,584	1,393,043	1,395,627	
Roughed and fin. on sep. stands.....	900	447,827	448,727	
Black sheets made on sheet or job mills.....	56,901	1,660,067	1,716,968	
Black plates, inc., black plates for tinning and black plate specialties rolled on tin mills.....	2,779	1,028,520	1,031,299	
Total.....	64,729	5,686,308	5,751,037	
1914—Gross Tons				
Universal plates.....	839	765,274	766,113	
Sheared plates—				
Rolled on single stands.....	1,660	1,168,678	1,170,338	
Roughed and fin. on sep. stands.....	.....	175,970	175,970	
Black sheets made on sheet or job mills.....	51,373	1,376,254	1,427,627	
Black plates, inc., black plates for tinning and black plate specialties rolled on tin mills.....	2,718	1,176,480	1,179,198	
Total.....	56,590	4,662,656	4,719,246	

The production of seamless steel tubes in 1914 amounted to 90,595 gross tons, against 108,567 tons in 1913, a decrease of 17,972 tons, or 16.5 per cent. Of the total in 1914, 36,939 tons were hot-finished and 53,656 tons were cold-drawn, as compared with 42,740 tons of hot-finished and 65,827 tons of cold-drawn tubes in 1913.

PRODUCTION OF CAST-IRON PIPE

The production of cast-iron pipe in 1914, as compared with 1913, was as follows, in net tons:

Kinds of pipe	1913		Total Net Tons
	Pipe	Fittings	
Gas and water.....	955,458	46,831	1,002,289
Soil and plumbers'.....	195,031	68,925	*263,956
Total.....	1,150,489	115,756	1,266,245
1914			
Gas and water.....	872,746	46,651	919,397
Soil and plumbers'.....	183,666	57,717	*241,383
Total.....	1,056,412	104,368	1,160,780

* Includes 7,727 tons of cast-iron culvert pipe in 1913 and approximately 18,900 tons of culvert pipe and fittings in 1914.

The production of wrought-iron and steel pipe and boiler tubes in 1914, compared with 1913, was as follows:

Kinds of Pipe	1913—Gross Tons		Total
	Iron	Steel	
Black standard.....	102,244	562,263	664,507
Black, standard.....	120,619	709,353	830,472
Galvanized.....	25,323	241,617	266,940
Oil country goods.....	84,778	756,311	841,089
O. D. and misc.....	2,159	177,052	179,211
Boiler tubes.....	43,188	84,632	127,820
Total.....	276,067	1,969,465	2,245,532
1914—Gross Tons			
Galvanized.....	31,896	233,133	265,029
Oil country goods.....	50,824	568,467	619,291
O. D. and misc.....	343	111,042	111,385
Boiler tubes.....	26,840	50,652	77,492
Total.....	212,147	1,525,557	1,737,704

The production of tin plates and terne plates for the past five years was as follows, in pounds:

1910.....	1,450,821,000	168,184,000	1,619,005,000
1911.....	1,597,629,000	158,441,000	1,756,070,000
1912.....	1,965,659,000	191,396,000	2,157,055,000
1913.....	1,708,186,000	136,944,000	1,845,130,000
1914.....	1,939,785,000	146,195,000	2,085,980,000

PRODUCTION OF ROLLED IRON AND STEEL

In 1914 the production of all kinds of iron and steel rolled into finished forms (including blooms, billets and axle blanks rolled for forging purposes and semi-finished products which were rolled for export in that year), shows a decrease of 6,421,047 gross tons, or 25.9 per cent, as compared with the output in 1913.

Of the total production in 1914 about 93.6 per cent was rolled from steel, as compared with about 93.2 per cent in 1913.

The production in 1914 of leading articles was as follows, in gross tons:

Articles	Iron	Steel	Total
Rails	56,590	1,945,095	1,945,095
Plates and sheets	4,725	4,662,656	4,719,246
Nail and spike plate	731	33,848	38,573
Wire rods	1,981	2,430,983	2,431,714
Structural shapes	563,171	2,029,143	2,031,124
Merchant bars		1,960,460	2,523,631
Bars for reinforced concrete work		288,471	288,471
Skelp, flue, and pipe iron or steel	264,340	1,718,091	1,982,431
Long angle splice bars, tie-plate bars, etc.	50,295	372,757	423,052
Hoops	180	211,028	211,028
Bands and cotton-ties		345,739	345,919
Rolled sheet piling, not including fabricated		35,314	35,314
Railroad ties		33,249	33,249
All other finished rolled products	223,802	714,116	937,918
Rolled forging blooms, forging billets, etc.	500	331,024	331,524
Exports of blooms, billets, sheet bars, etc.	1,461	90,446	91,907
Total, gross tons	1,167,776	17,202,420	18,370,196

In addition to the 35,314 tons of rolled sheet piling above reported there were produced by rolling mills and steel works in 1914 about 11,483 tons of fabricated sheet piling, as compared with 13,463 tons in 1913. The following table gives leading details of the output annually of iron and steel rolled into finished forms, from 1910 to 1914 inclusive:

Years	Iron and Steel Rails	Plates and Sheets, Except Nail Plates	Wire Rods	Structural Shapes, Not Including Plates	Nail Plate	Bars, Skelp and All Other Forms	Total, Gross Tons
1910.....	3,636,031	4,955,484	2,241,830	2,266,890	45,294	8,475,750	21,631,279
1911.....	2,822,790	4,488,049	2,450,453	1,912,367	48,522	7,316,990	19,039,171
1912.....	3,327,915	5,875,080	2,653,553	2,846,487	45,331	9,908,475	24,656,843
1913.....	3,502,780	5,751,037	2,464,807	3,004,972	37,503	10,030,144	24,791,243
1914.....	1,945,095	4,719,246	2,431,714	2,031,124	38,573	7,204,444	18,370,196

CANADIAN IRON AND STEEL

Production of Pig Iron, Steel Ingots and Rolled Products in 1914

The statistics gathered by the American Iron and Steel Institute show that the output of pig iron in Canada in 1914 was 705,972 tons, against 1,015,118 tons in 1913. In 1912 Canada's pig-iron production was 912,878 tons and in 1911 it was 824,368 tons. Of the 1914 total 690,880 tons was coke iron and 15,092 tons charcoal iron. The number of furnaces in blast in Canada at the end of 1914 was 6; the number out of blast, 16. The production of pig iron by grades in 1914 was as follows, comparison being made with 1913.

	1914	1913
Basic	331,456	558,524
Bessemer	184,053	227,662
Foundry	174,346	225,231
All other	16,117	3,701
Total	705,972	1,015,118

The production of steel ingots and castings in Canada in 1914 was 694,447 tons, of which 675,691 tons was ingots and 18,756 tons castings. The production of open-hearth steel was 549,716 tons, of Bessemer steel, 144,447 tons and of other kinds, 284 tons. The total of 694,447 tons includes about 4800 tons of alloy treated steel ingots and castings, against about 1852 tons in 1913.

The production of finished rolled products in Canada in 1914 was 659,519 tons, against 967,097 in 1913. The production of rails last year was 382,344 tons, against 506,709 tons; of structural shapes and wire rods, 59,050 tons, against 68,048 tons; of plates and sheets, nail plate, merchant bars, tie plate bars, etc., 218,125 tons, against 392,340 tons. The production of rolled iron products in 1914 was 47,309 tons, while the production of rolled steel products was 612,210 tons.

The production of iron and steel cut and wire nails in Canada in 1914 is estimated at 1,144,000 kegs, as compared with an estimated production of 1,520,000 kegs in 1913.

The production of finished angle splice bars, plates, fish plates, and other rail joints and fastenings in Canada by rolling mills and steel works in 1914, all steel, not including spikes, bolts, nuts, and similar fastenings, amounted to 34,165 gross tons, as compared with 54,839 tons in 1913 and 52,157 tons in 1912.

The total production of cast-iron gas and water pipe and fittings and cast-iron soil and plumbers' pipe and fittings in Canada in 1914 was about 93,200 net tons, as compared with an estimated production in 1913 of 96,800 net tons, a decrease of 3600 tons.

OUR PIG-IRON OUTPUT IN 1915

Production in the United States in First Half of the Year, 12,233,791 Tons

The American Iron and Steel Institute has published in the past week its statistics of pig-iron production for the first half of 1915. The total, as appears from tables on the opposite page, was 12,233,791 gross tons, against 12,536,094 tons in the first half of 1914 and 10,796,150 in the second half of last year. The production of basic iron in the first half of this year was 5,259,647 tons, as compared with 5,010,647 tons in the first half and 4,660,040 tons in the second half of 1914. The production of Bessemer and low phosphorus pig iron in the first half of

this year was 4,238,587 tons. In the first half of 1914 it was 4,378,098 tons and in the second half 3,481,029 tons. The production of spiegeleisen and ferromanganese amounted to 90,310 tons, against 86,154 in the first half and 99,864 tons in the second half of last year.

The distribution of the pig-iron output in the first six months of this year among the different grades is shown as follows, comparison being made also with the first half and second half of 1914:

Pig-Iron Production by Grades First Half of 1915—

	Gross Tons First half of 1914	Second half of 1914	First half of 1915
Basic	5,010,647	4,660,040	5,259,647
Bessemer and low phos. ..	4,378,098	3,481,029	4,238,587
Foundry	2,454,540	2,078,714	2,267,371
Malleable	383,139	288,632	278,251
Forge	197,483	164,168	188,756
Ferro and spiegel	86,154	99,864	90,310
Other grades	26,033	23,703	20,690
	12,536,094	10,796,150	12,233,791

The half year's production of coke pig iron was 12,061,808 tons, of anthracite and mixed anthracite and coke pig iron, 42,487 tons; of charcoal pig iron, 129,496 tons. In the first half of 1914 charcoal pig-iron production was 143,767 tons and in the second half 120,157 tons. It will be seen that there has been but a small increase this year over the rate of charcoal pig-iron production in the second half of 1914.

The statistics show that of the 12,233,791 tons of pig iron produced in the first half of this year 8,578,600 tons was for makers' use and 3,655,166 tons was made for sale.

The steel plants on the east side of the Mississippi River at St. Louis report heavy increases in the number of men put at work within the past two weeks. The American Steel Foundries has about 2000 men on its rolls and reports the business in hand general in character, none of it being due indirectly or directly to war orders. The East St. Louis Bridge Company, which has heavily increased its forces because of the demand from county authorities and from railroads for bridge material, is running its plant night and day.

PRODUCTION OF PIG IRON IN THE UNITED STATES IN THE FIRST HALF OF 1915.

HALF-YEARLY OUTPUT OF PIG IRON BY STATES.

HALF-YEARLY PRODUCTION OF ALL KINDS OF PIG IRON.

States.	Blast furnaces.			Production—Gross tons. (Includes spiegeleisen, ferro-mang., ferro-silicon, ferro-phosphorus, etc.)		
	June 30, 1915.			First half of 1914.	Second half of 1914.	First half of 1915.
	In blast Dec. 31, 1914.	In.	Out.			
Massachusetts	1	0	2	2		
Connecticut	1	1	2	3		
New York	12	16	11	27	818,425	741,439
New Jersey	1	1	4	5		
Pennsylvania	63	96	62	158	5,207,051	4,526,318
Ohio	2	2	3	5	101,605	93,989
Indiana	3	5	17	22	164,796	106,432
Illinois	0	0	4	4		
Michigan	0	0	2	2		
Missouri	18	20	28	48	902,186	924,743
Wisconsin	1	1	3	4		
Minnesota	1	1	5	6	136,742	99,651
Iowa	0	0	1	1		
Nebraska	4	5	13	18	113,137	103,601
Arkansas	31	50	24	74	2,865,367	2,418,059
Louisiana	7	12	14	26	1,045,905	801,546
Alabama	4	10	0	10	851,700	705,655
Georgia	9	8	6	14		
Florida	3	4	4	8	195,991	133,535
South Carolina	0	1	0	1		
North Carolina	1	1	1	2		
Virginia	2	2	4	6		
Tennessee	0	0	1	1	128,897	138,880
Kentucky	0	0	1	1		
West Virginia	0	0	0	0		
Mississippi	0	0	0	0		
Alabama	0	0	0	0		
Total	164	236	212	448	12,536,094	10,796,150

HALF-YEARLY PRODUCTION OF COKE PIG IRON.

New York	12	16	7	23	818,425	741,427	921,566
New Jersey	1	1	4	5			
Pennsylvania	58	91	44	135	5,147,691	4,490,988	5,155,120
Ohio	1	2	2	4	101,605	93,739	85,578
Indiana	3	5	15	20			
Illinois	0	0	2	2	163,330	104,429	105,244
Michigan	0	0	1	1			
Missouri	16	18	26	44	893,867	912,904	853,445
Wisconsin	1	1	3	4	136,617	99,634	79,228
Minnesota	1	1	4	5	113,137	101,527	82,992
Iowa	30	49	24	73	2,865,267	2,416,981	2,964,007
Nebraska	7	12	14	26	1,045,905	801,546	801,951
Arkansas	4	10	0	10			
Louisiana	2	2	1	3	890,814	728,740	851,084
Alabama	2	3	3	6			
Georgia	0	1	0	1			
Florida	0	0	1	1			
South Carolina	2	2	4	6	158,162	150,121	161,593
North Carolina	0	0	1	1			
Virginia	0	0	0	0			
Total	144	219	168	387	12,334,820	10,642,036	12,061,808

ANTHRACITE AND MIXED ANTHRACITE AND COKE PIG IRON.

New York	0	0	3	3			
Pennsylvania	3	2	15	17	57,507	33,957	42,487
Total	3	2	18	20	57,507	33,957	42,487

HALF-YEARLY PRODUCTION OF CHARCOAL PIG IRON.

Massachusetts	1	0	2	2			
Connecticut	1	1	2	3			
New York	0	0	1	1	4,292	2,314	3,087
New Jersey	0	0	0	0			
Pennsylvania	2	3	3	6	1,853	1,373	1,814
Ohio	1	0	1	1			
Indiana	0	0	2	2	1,466	2,253	95
Illinois	2	2	2	4	8,319	11,839	14,896
Michigan	0	0	2	2			
Missouri	0	0	1	1			
Wisconsin	0	0	1	1			
Minnesota	0	0	1	1			
Iowa	1	1	0	1			
Nebraska	7	6	5	11	106,203	88,496	98,856
Arkansas	1	1	1	2			
Louisiana	1	1	0	1			
Alabama	0	0	1	1	21,409	10,713	10,544
Georgia	0	0	0	0			
Total	17	15	26	41	143,767	120,157	129,496

TOTAL PRODUCTION OF PIG IRON ACCORDING TO FUEL USED.

Anthracite	144	219	168	387	12,334,820	10,642,036	12,061,808
Coke	3	2	18	20	57,507	33,957	42,487
Charcoal	17	15	26	41	143,767	120,157	129,496
Total	164	236	212	448	12,536,094	10,796,150	12,233,791

* Includes mixed anthracite and coke pig iron.

HALF-YEARLY OUTPUT OF PIG IRON BY GRADES.

HALF-YEARLY PRODUCTION OF BASIC PIG IRON.

States.	First half of 1914.	Second half of 1914.	First half of 1915.
New York, New Jersey	153,112	236,075	248,725
Pennsylvania—Allegheny County	1,326,364	1,293,261	1,468,844
Other counties	1,346,789	1,300,390	1,421,826
Virginia, Alabama	295,283	247,869	315,133
Ohio	798,505	709,768	841,226
Indiana, Illinois	942,104	737,064	809,005
Michigan, Missouri, Colorado	148,490	135,613	154,855
Total	5,010,647	4,660,040	5,259,614

HALF-YEARLY PRODUCTION OF BESSEMER AND LOW-PHOSPHORUS.

New York	170,854	78,148	170,149
Pennsylvania	1,880,451	1,422,803	1,749,755
Maryland	101,605	93,739	73,449
West Virginia, Kentucky, Tennessee	112,339	69,697	70,214
Ohio	1,551,795	1,353,670	1,661,516
Illinois	561,054	462,972	513,504
Total	4,378,096	3,481,029	4,238,587

HALF-YEARLY PRODUCTION OF FOUNDRY PIG IRON.*

Massachusetts, Connecticut	4,292	2,302	3,087
New York, New Jersey	405,388	297,504	426,023
Pennsylvania	401,449	330,176	405,199
Maryland, Virginia, West Virginia	163,477	100,560	103,409
Kentucky, Mississippi	30,545	39,768	17,328
Tennessee	94,437	82,280	69,558
Alabama	577,139	645,970	529,159
Ohio	364,457	246,037	300,764
Indiana, Illinois	72,520	101,967	65,960
Michigan	160,248	126,445	164,984
Wisconsin	132,126	73,213	77,482
Minnesota, Missouri, Colorado, California	48,462	32,492	44,422
Total	2,454,540	2,078,714	2,207,375

* Includes ferro-silicon and a small quantity of silico-spiegel.

HALF-YEARLY PRODUCTION OF MALLEABLE PIG IRON.

New York	80,445	125,034	72,815
Pennsylvania	53,055	4,463	19,593
Kentucky, Ohio	110,568	65,251	102,136
Illinois, Michigan, Wisconsin	139,071	93,884	83,968
Total	383,139	288,632	278,512

HALF-YEARLY PRODUCTION OF FORGE PIG IRON.

New York, New Jersey	6,162	4,001	3,438
Pennsylvania	128,874	91,940	62,074
Virginia	3,192	7,997	2,673
Tennessee	1,652	1,534	380
Alabama	17,111	14,021	16,425
Ohio	40,492	44,675	53,799
Total	197,483	164,168	138,789

HALF-YEARLY PRODUCTION OF SPIEGELEISEN AND FERRO-MANGANESE.

Penna., Md., Ala., Illinois, Colo., Cal.	86,154	99,864	90,310
Total	86,154	99,864	90,310

HALF-YEARLY PRODUCTION OF OTHER GRADES.

New York, New Jersey	2,464	677	416
Pennsylvania	3,809	3,341	4,766
Virginia, Tennessee, Alabama	16,197	13,058	9,920
Ohio	3,109	3,014	4,770
Indiana, Illinois, Michigan, Wisconsin	454	3,613	732
Total	26,033	23,703	20,604

PIG IRON MADE FOR SALE OR FOR USE OF MAKERS IN THE FIRST HALF OF 1915.

States.	For sale.	For maker's use.	Total. Gross tons.
Massachusetts, Connecticut	2,487	600	3,087
New York, New Jersey, Maryland	626,760	380,479	1,007,239
Pennsylvania	887,626	4,311,795	5,199,421
Virginia, West Virginia, Alabama	811,164	200,799	1,011,963
Kentucky, Tennessee	123,796	46	123,842
Ohio	672,720	2,291,491	2,964,211
Indiana, Illinois	171,532	1,266,102	1,437,634
Mich., Wis., Minn., Mo., Col., Cal.	359,061	127,313	486,374
Total	Gross tons. 3,655,166	8,578,625	12,233,791

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The Rise in Steel-Making Irons

The pig-iron market at Pittsburgh and in the Mahoning and Shenango valleys has seen a distinct revival in demand within a few weeks that has carried up prices on Bessemer and basic iron fully \$1 a ton and on foundry grades about 50c. Up to early June, Bessemer and basic iron had shown no indication of sharing in the better conditions that had come to the steel trade. But with large purchases of these two grades in June by two Youngstown steel companies, a good deal of iron that had been piled at Valley furnaces for months was taken out of the market, and at once there was a stronger tone. The smaller steel companies that have no blast furnaces had been gradually filling up with work and were beginning to look around for more iron. A moderate buying movement in July put prices up on both Bessemer and basic iron about 25c. a ton. But with August good-sized sales of Bessemer and basic were made, not only in the Pittsburgh district, but at Cincinnati and other places. From these it developed that the supply of these irons was less than had been thought, and further that it was in strong hands. The result has been that in 10 days' time Bessemer and basic irons have advanced \$1 a ton, with indications of a still higher market. On July 1 Bessemer iron was only fairly firm at \$13.75 at Valley furnace, whereas last week sales were made at \$14.75, Valley furnace, and sellers are now holding for \$15 and higher. On July 1 basic iron was about \$12.65 at Valley furnace; it sold last week as high as \$13.75 at Valley furnace, with reports that \$14 was done for prompt shipment. In the Pittsburgh district all the blast furnaces except one are owned by steel companies that use all the pig iron they make. Only four stacks at Pittsburgh are idle and two of these are isolated furnaces of the leading maker that are operated only when demand is abnormal. The other two are being repaired preparatory to operation, but others that have made long runs must be relined. In the Mahoning Valley, twenty-one out of twenty-five stacks are active, and three of those idle are small merchant furnaces that can make but 250 tons a day each or less. The other is practically a new stack and may start soon. In the Shenango Valley, eight out of nineteen stacks are idle, but all are small except one at Sharpsville, which will go in within a month.

It will be seen, therefore, that from the stand-

point of available capacity the situation in pig iron in the Central West is strong, in view of the fact that the leading steel companies there are operating their steel plants at close to 100 per cent of capacity and are steadily melting all their own pig iron while Youngstown companies are using up also the recently bought in the market. Further advance in price will depend on the extent to which the steel companies call on the merchant furnaces. On the surface the indications are that in late lean years the steel-making capacity of the larger companies has somewhat outrun their pig-iron capacity.

Only the Coke Market Drags

At the end of June the interesting observation could be made that while the steel mills had more than doubled their rate of operation, as compared with last December, and were quoting prices averaging \$2 to \$3 a ton above the low point, the market for pig iron, scrap and coke had shown no definite improvement. Since then pig iron and scrap have dropped out of the category, and only the coke market drags. The advances in pig iron in June represented no more than a general stiffening. In the past ten days prices are reported to have been paid which represent sensational advances compared with the lethargy the pig iron market exhibited for many months, and many pig iron sellers now express confidence that these advances represent "only the beginning." In scrap there has been a sudden and remarkable upturn, with melting steel grades bringing about \$2 a ton more than could be obtained in June.

Following a slight stiffening in June, Connellsville furnace coke for prompt shipment exhibited one of its characteristic rises over the national high day, only to drop eventually to as low a price as ever. The commodity now occupies a unique position from the viewpoint of the coke operators an unfavorable position in the general list of commodities involved in the iron and steel industry.

According to precedents coke is too cheap in the circumstances. It should have had a substantial rise by this time, and should be in line for further and sharp advances. Perhaps, however, it is the precedents that have been abnormal. From November, 1911, to December, 1912, Connellsville furnace coke for prompt shipment advanced from \$1.50 to \$4. In the same period basic pig iron at Valley furnaces advanced from \$12.25 to \$16.

at was \$2.50 for coke and \$4.25 for pig iron, but was also 167 per cent for coke and only 35 per cent for pig iron. The coke operators have profited such bulges over a period of years and have been able to maintain interest and exhaustion charges by moderately well even with such assistance, holding their coke in periods of dullness at prices which did not include anything like the proper charges. While the coke trade has come to regard high prices as its right at more or less finite intervals, at long range the course of the market does not seem to have been an altogether reasonable one.

The rapid adoption of the by-product coke oven, at the point of coke consumption and usually furnishing gas for steel mill operation as well, has been dictated in large part by the economies that could be figured, as compared with a beehive proposition, but an influence that must not be lost sight of is the dissatisfaction coke buyers have felt at being occasionally required to pay very fancy prices for beehive coke purchased in the market. Sentiment frequently enters into business, and the occasional payment of \$3 or \$4 for coke that sometimes costs only \$1.50 influences the mind of the buyer to a greater extent than the mere difference in dollars would suggest.

The erection of by-product ovens is proceeding at present no less rapidly than in the past. New construction items in less than a month past include the doubling of the Republic plant at Youngstown and the erection of a plant at Cleveland, to serve our blast furnaces. Such items may be lost track of by the general observer, but the retort ovens are contributing such rapidly increasing tonnages to the general coke supply that the Government statistics, somewhat belated as they are, never fail to present an accurate picture of the situation existing when they are published. The iron trade seems to fear no coke shortage, however active it may become.

The By-Product Oven's New Position

Since the above comment on the backwardness of coke prices was written, the Geological Survey's statistics, somewhat belated as they are, never in the question just discussed is interesting, but of greater interest is the proof given of the rapidly increasing influence of the retort process. Last year's production of beehive coke was 23,335,971 net tons, while the amount produced in by-product ovens was 11,219,943 net tons. Thus the retort contributed a larger percentage than ever, or nearly one-third, of the country's coke production. The showing is that in times of depression by-product ovens will run, whatever happens to beehive ovens. No other conclusion can be drawn from the idleness throughout all of 1914, of 44,450 beehive ovens, or 47.3 per cent of the total, while the number of by-product ovens out of commission all the year was 667, or only 11.5 per cent of the total.

That beehive ovens are being put on the idle list in large numbers by the increase in by-product coke operations is plainly indicated. Just as in Germany blast furnaces have gone on producing pig iron, even though there was no market for it, because the power engagements of the blast furnace

as a gas producer made a stoppage serious, so by-product coke ovens will be run in times of slackness in the iron trade, because the by-products would yield a profit when beehive coke ovens could only run at a loss. It is not only true, as was predicted some years ago, that by-product ovens will be built for practically all of the future expansion of the coke industry, but the stage has been reached at which beehive ovens are being put out of business permanently by new retort construction. The figures below show how the by-product oven has been making headway since the country's production of by-product coke passed the 1,000,000-ton mark.

Production of Beehive and By-Product Coke in the United States

	By-product Coke		Beehive Coke		Total Net Tons
	Net Tons	Per Cent of Total	Net Tons	Per Cent of Total	
1893....	12,850	0.01	9,464,730	99.99	9,477,580
1901....	1,179,900	5.41	20,615,983	94.59	21,795,883
1907....	5,607,899	13.75	35,171,665	86.25	40,779,564
1908....	4,291,226	16.14	21,832,292	83.86	26,033,518
1909....	6,254,644	15.91	33,060,421	84.09	39,315,065
1910....	7,138,734	17.12	34,570,076	82.88	41,708,810
1911....	7,847,845	22.07	27,703,644	77.93	35,551,489
1912....	11,115,164	25.27	32,868,435	74.73	43,983,599
1913....	12,714,700	27.46	33,584,830	72.54	46,299,530
1914....	11,219,943	32.50	23,335,971	67.50	33,555,914

A much more striking showing will be made for the by-product oven by the end of 1916 when ovens of this type now under construction will have come into the producing column, for the impetus of the past year has been remarkable. The time was when fears were expressed lest the market for by-products would be glutted. That bogey is less influential to-day than ever. Consumption of tar and ammonium sulphate is increasing and the demand for benzol, toluol and xylol has been such as to put spurs to every enterprise involving the production of coke in retorts.

Brilliant Crop Prospects

The report of the Department of Agriculture giving the condition of the crops on August 1 is always awaited with great interest in business circles. This is the time when the winter wheat crop is practically harvested, the spring wheat crop is so well advanced toward maturity that its condition is established with some certainty, the corn crop is in such shape that predictions can almost safely be made as to its outcome, and the crops of other grains are well assured. This year the August statement is of much higher import than usual because good crops appear to have been the one important element yet needed to clinch our hold on prosperity.

It has therefore proved highly satisfactory to the country to find that the official report shows the prospects for the crops to be the best in our history. The Government statisticians figure that the total wheat crop will be 966,000,000 bushels, which is the largest yield ever recorded. Last year the crop was 891,000,000 bushels. The wheat crop alone will probably be worth more than \$1,000,000,000. The showing for the corn crop is that a yield may be expected of 2,918,000,000 bushels, against 2,673,000,000 bushels last year. Thus the corn crop is expected to be the second largest ever produced, the largest having been in 1912, when the yield was 3,124,746,000 bushels. The value of this year's corn crop may reach \$2,500,000,000. The crop of oats is expected to be 1,402,000,000 bushels, against 1,141,-

000,000 bushels last year. The August showing for barley, rye and buckwheat presages a larger yield for this year than in 1913. Crops of potatoes, rice, hay, etc., are all larger than last year. The abundant rains of this summer have caused all kinds of vegetation to grow most luxuriantly, thus providing ample food for cattle and indicating that the production of provisions the coming fall and winter should be in excess of recent years.

The bountiful yield of the farm is of course of first importance to the people, as on this depends the cost of living. It is comforting to know that the needs of our population for the coming year are to be well supplied. Of next importance is the fact that the prosperity of the railroads rests in such great measure on the amplitude of the country's crops. Increased traffic now seems assured, and even though the railroads may not get as good a rate per unit for transportation as they desire they will be in much better position when hauling full loads of freight than when crops are under normal and the movement is correspondingly light. The steel trade needs but the addition of a fair demand for iron and steel products from the railroads to put their business on a thoroughly substantial basis. All classes of our people may well take renewed hope from the brilliant crop showing which has just been laid before them.

Statistics of Working Value

The midsummer pig-iron statistics of the American Iron and Steel Institute show again how closely readers of THE IRON AGE are able to gage the trend of the industry by the figures supplied in our monthly blast furnace reports. Considering the conditions under which the monthly reports are prepared, the liability to error in the transmission of many of the returns by wire, the chances for clerical errors on the part of senders and compilers, in view of the time requirements of the work, and the fact that each month some outputs are estimated, it is remarkable that there is so close agreement as is shown in the following, representing the production of coke and anthracite pig iron in the first half of 1915:

	Gross tons
American Iron and Steel Institute figures.....	12,104,295
IRON AGE figures, January-June.....	12,100,817
Deviation	3,478
Extent of deviation 0.0003.	

A variation of three one-hundredths of 1 per cent may very fitly be called negligible.

Capacity for Making Munitions

Readers of THE IRON AGE who have equipment which could be utilized in the production of shrapnel or high explosive shells will have more than passing interest in the canvass the War Department is about to make, as described elsewhere in this paper. It can be readily understood that the information which will be gathered might become, under some circumstances, of first importance to the Government. The experience many members of the metal-working trades have gained in manufacturing munitions for the belligerent nations, they may well hope will not be requisitioned by their own country; but if it should be, they will be glad that

the call finds them not empty handed. We have one suggestion in this matter and that is that readers of this paper who have such facilities as are referred to in the Ordnance Bureau's circular of inquiry send for a copy of it, if they have not already been addressed on the subject, so that there may be on file at Washington full data for the carrying out of an adequate program of preparedness.

CORRESPONDENCE

Impairment of Steel by Burning

To the Editor: I have read with interest the article entitled "Detecting Burnt Steel," which appeared in THE IRON AGE of July 22. It recalls to my mind that a lecturer on metallurgy at the Pratt Institute, Brooklyn, in 1905, told his audience that it was a false theory that steel could be so burnt that the burnt part would be worthless. On the following day I tried out the theory of reclaiming burnt steel set forth by the speaker and found it to be correct. He suggested that a piece of ordinary tool steel, for convenience about 5/16 in. square, be nicked at places 3/4 in. apart, and all that section be burnt which had been nicked; then to let it cool in the air until cold, burn it again and allow it to cool again, when it would be found that the steel would have resumed its normal state.

To prove this I took a piece of Jessop tool steel 3/4 in. square and hack sawed one-quarter of the way through at intervals of 3/4 in. in three sections. I burnt all those 3/4-in. sections and to prove that I burnt them I quenched the first two sections in water, broke off one section and could see at the break that it was burnt. I then reheated the other two sections until they became burnt a second time, and allowed them to cool in the air. Then I heated them the third time to a cherry red and quenched them, and after breaking off the second section I saw at the break that the steel was of a finer grain than a fresh piece hardened but not burnt, which I had also prepared. I used some of the steel in a lathe turning tool and found that the change made the cutting edge of the tool better than it had been before burning, since it stood up on a 70 per cent more speed and 40 per cent more cut and feed than before it was burnt.

CHARLES WESLOW.

BROOKLYN, N. Y., July 27, 1915.

At a recent meeting of the directors of the Skinner Chuck Company, New Britain, Conn., the following officers were elected: President, Charles E. Glover; vice-president, E. J. Skinner, and secretary and treasurer, Paul K. Rogers. This change, which is practically the first since the organization of the company in 1888, is in accordance with the desire of David N. Camp, the former president, and David O. Rogers, the former vice-president and general manager. The new president, Mr. Glover, was vice-president of the American Hardware Corporation and general manager of the Corbin Screw Division. The new vice-president and general manager, E. J. Skinner, is a son of one of the founders of this company and for many years has been secretary and assistant treasurer. His successor, Paul K. Rogers, is the son of the retiring vice-president and general manager.

The Fulton Iron Works, St. Louis, builder of sugar-mill machinery, reports the closing of orders for equipment up to Aug. 1 aggregating \$2,000,000, which will require until March to complete, operating the plant night and day. About one-third of the orders are from South America, being the direct result of the inability of European builders to meet the demand for such equipment, in consequence of the war. The remaining two-thirds will go to the West Indies. The directors of the plant are considering plans for an increase in capacity.

HIGH-SPEED STEEL PRICES

Advance in Four Months Amounts to 70 Per Cent

A survey of the tool steel situation in New England shows that high-speed steel is selling at 70c. to \$1.35 per lb., depending on the brand, with the average probably between 80c. and 90c. This compares with an average of 50c. four months ago, showing that high-speed steel has increased in price in the four months about 70 per cent. Some large sales were made in April, at about 37c. per lb.

Some buyers bought in excess of their needs and before the price took its rapid advance, these buyers foreseeing the tendency, and some distributors believe that there is a supply of steel available for a number of weeks. Importations are still being made and the interesting fact is that tungsten is at present cheaper in England than it is here, taking into account the tariff of 15 per cent.

The growing scarcity of chromium is regarded as a factor likely to augment the increasing price of high-speed steel, as commonly this employs 4 per cent chromium. Distributors expect to see a wider use of the practice of welding high-speed steel to carbon steel bars for cutting tools, but they do not believe conditions are such that carbon steel, even heat treated in the most careful way, is likely to be urged as a substitute for high-speed steels. They speak of the need of caution, regarding tool steel made by melting high-speed steel scrap, for which as high a price as 20c. per lb. has been paid. It is held that no reliance can be placed on a careful segregation in a given shop of the high-speed steel scrap and therefore the remelted product will not measure up to makers' brands of high-speed steel.

The Vanadium-Alloys Steel Company, Pittsburgh, announces that owing to the scarcity of ferrotungsten it has withdrawn all prices for high-speed steel, and at present is quoting for immediate acceptance as follows: Red Cut Cobalt, bar stock, round, flat and square, \$1.15 per lb., base. Red Cut Superior, bar stock, round, flat and square, \$1.05 per lb., base. Red Cut Cobalt treated bits, \$1.50 per lb. Red Cut Superior, treated bits, \$1.25 per lb. High-speed discs, of either of the above grades, 10 per cent over list prices.

Slatington Rolling Mills to Close Indefinitely

The Slatington Rolling Mills, manufacturer of high grade wrought-iron bars, Slatington, Pa., has closed its plant indefinitely, owing to dissensions among the stockholders. The minority stockholders have applied for a receiver. The officers of the company made a determined effort and have succeeded in paying in full all creditors they owed for material, etc., and nobody will then lose money but the stockholders themselves. The company is selling all finished bar iron and raw material on hand, and turning such stock into available funds. After an existence of 25 years, and building up a high reputation, it is regrettable to note that this company is obliged to withdraw from the field at this time through such a cause.

The Harlan & Hollingsworth Corporation, Wilmington, Del., has closed contracts for two tank steamers for the Standard Oil Company and a passenger steamer for the Wilson Line, representing a total of about \$1,250,000. In addition the company has contracts for the construction of three tankers for the Anglo-Saxon Petroleum Company, London, one for the Mexican Oil Company and three vessels for the Shell Company of California.

The Navy Department has awarded to the International Oxygen Company, 115 Broadway, New York, the contract for the erection of a hydrogen generating plant for ballooning purposes at the aeronautic station of the navy yard at Pensacola, Fla. The company has also received the award from the Government for the installation of its system for generating oxygen and hydrogen at the navy yard at Washington, D. C.

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Steel Corporation's Unfilled Orders Increase

The Steel Corporation's monthly statement of unfilled orders on its books July 31, 1915, shows a total of 4,928,540 tons, as compared with 4,678,196 tons on June 30, 1915, an increase of 250,344 tons. This increase is not as large as that of June, which was 413,598 tons, but the gain is greater than that made in May, 102,354 tons, after decreases in March and April of more than 90,000 tons each. On July 31, 1914, the total was 4,158,589 tons, or 769,951 tons less than for the corresponding date of this year. The next larger amount of unfilled orders was on Feb. 28, 1914, and amounted to 5,026,440 tons. The following table shows the unfilled tonnage for each month beginning with the high point of Dec. 31, 1912:

July 31, 1915.....	4,928,540	March 31, 1914.....	4,653,825
June 30, 1915.....	4,678,196	Feb. 28, 1914.....	5,026,440
May 31, 1915.....	4,264,598	Jan. 31, 1914.....	4,613,680
April 30, 1915.....	4,162,244	Dec. 31, 1913.....	4,282,108
March 31, 1915.....	4,255,749	Nov. 30, 1913.....	4,396,347
Feb. 28, 1915.....	4,345,374	Oct. 31, 1913.....	4,513,767
Jan. 31, 1915.....	4,248,571	Sept. 30, 1913.....	5,003,785
Dec. 31, 1914.....	3,836,643	Aug. 31, 1913.....	5,223,468
Nov. 30, 1914.....	3,824,592	July 31, 1913.....	5,399,356
Oct. 31, 1914.....	3,461,097	June 30, 1913.....	5,807,317
Sept. 30, 1914.....	3,787,667	May 31, 1913.....	6,324,322
Aug. 31, 1914.....	4,213,331	April 30, 1913.....	6,978,762
July 31, 1914.....	4,158,589	March 31, 1913.....	7,468,956
June 30, 1914.....	4,032,857	Feb. 28, 1913.....	7,656,714
May 31, 1914.....	3,998,160	Jan. 31, 1913.....	7,827,368
April 30, 1914.....	4,277,068	Dec. 31, 1912.....	7,932,164

The Port Henry, N. Y., furnace of the Northern Iron Company, which was last in blast on a test of titaniferous ore, will be blown in soon after Aug. 20, having undergone the repairs made necessary by the experiment. It has a capacity of 6000 to 7000 tons per month and will go on foundry iron.

The Iron and Metal Markets

DOMINATED BY STEEL

Basic and Bessemer Pig Iron Up \$1

Active Buying by Steel Makers—Southern Iron Higher

Active buying at advancing prices has centered attention on the pig-iron market. Steel-making pig iron has led in tonnage and has advanced \$1 a ton in nearly all markets except Chicago. Thus the heavy demand for open-hearth steel, which caused so abrupt a rise in billets, is now also the dominant factor in pig iron.

Some excitement has been added to the situation by a reported purchase of pig iron at Cleveland by the Steel Corporation, but confirmation of this report is lacking. Naturally the possibility that the large steel companies would need to go into the market for iron, as at other times of cumulative demand for steel, has been a factor in the week's advance.

Signs have multiplied that after many months of groveling prices a seller's market has returned. While there is no scramble for finished material, some manufacturing consumers who made large contracts at prices \$2 to \$3 below present levels are finding it difficult to get full deliveries—a condition that has been known to bring on buying to forestall further advances.

The larger part exports are playing is seen in June shipments of 355,000 tons of such iron and steel products as are reported by weight, against 263,000 tons in May. The rate to-day is probably 400,000 tons.

The Steel Corporation's increase of 250,000 tons in unfilled orders in July, while 163,000 tons short of the increase in June, is to be taken in the light of much heavier shipments last month, as additional capacity was set at work.

The week's buying of basic iron may have reached 125,000 tons, nearly all markets participating. At Pittsburgh under scattered buying the price has gone from \$13 to \$14, Valley furnace, while Bessemer iron has now reached \$15 at furnace. In eastern Pennsylvania sales of 35,000 tons of basic iron have been made to three steel companies, the earlier transactions being at \$15, but this week \$15.25 delivered was paid for 10,000 tons. St. Louis and Indiana sales amount to 20,000 tons. Southern Ohio reports a sale of 20,000 tons, and inquiries are pending in the Middle West for 60,000 to 75,000 tons. Ohio and Chicago district furnaces have taken some business which the sharp advances of Southern producers put out of the latter's reach.

In foundry iron a 20,000-ton sale to a sanitary interest at Pittsburgh leads in tonnage. Deliveries are for the first half of 1916. More and more inquiry for next year is coming out. Producers would stave off such business, though granting that some backlog orders might be taken at \$1 above recent prices.

Southern iron has been advanced quickly to \$11 for No. 2 at Birmingham for delivery this year, while one interest has announced a price of \$12.50

for 1916 iron. In all markets foundry iron has been more active, but thus far larger interests have done most of the buying.

With Central Western producers sold up on billets and sheet bars for several months ahead, prices are largely nominal at \$23 for Bessemer and \$23.50 for open-hearth billets, Pittsburgh. In eastern Pennsylvania at \$30 and higher, billets have been sold in small quantities, but negotiations are pending for more than 25,000 tons of rerolling billets.

In the finished material market the uncertainty as to steel supply due to the abnormal demand for large rounds and for steel to be forged is a strong influence. Few important domestic orders for shapes, plates and bars come out from week to week, and apart from implement makers few consumers are covered into 1916. Little has been done at 1.35c., Pittsburgh, which some producers now ask for all three products.

At Chicago bar iron has advanced \$1 a ton and in Eastern districts considerable sales of bar iron have been made on a Pittsburgh basis.

An Eastern inquiry for 30,000 tons of square bars has resulted from the recent Russian purchase of spikes and the negotiations for still larger tonnages. Shrapnel rounds are held at stiff prices in view of recent inspection developments, particularly the rigid requirements as to cropping and reheating.

While domestic rail orders have lagged, there has been further negotiation on Russia's requirements, and 100,000 tons of the 160,000 tons recently reported placed will probably be redistributed.

Steel melting scrap has been active and higher, and in the Pittsburgh market the advance has outrun that in pig iron.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type,
Declines in Italics

At date, one week, one month and one year previous

	Aug. 11,	Aug. 4,	July 14,	Aug. 12,
Pig Iron, Per Gross Ton:	1915.	1915.	1915.	1914.
No. 2 X, Philadelphia...	\$14.75	\$14.50	\$14.25	\$14.75
No. 2, Valley furnace...	13.25	12.75	12.75	13.00
No. 2 Southern, Cin'ti...	13.00	13.15	12.65	13.25
No. 2, Birmingham, Ala...	11.00	10.25	9.75	10.00
No. 2, furnace, Chicago*	13.25	13.50	13.00	13.75
Basic, del'd, eastern Pa...	15.25	14.00	14.00	14.00
Basic, Valley furnace...	14.00	13.00	13.00	13.00
Bessemer, Pittsburgh...	15.95	15.20	14.95	14.90
Malleable Bess., Ch'go*	13.25	13.50	13.00	14.00
Gray forge, Pittsburgh...	13.95	13.45	13.45	13.65
L. S. charcoal, Chicago...	15.75	15.75	15.75	15.75

Billets, etc. Per Gross Ton:				
Bess. billets, Pittsburgh...	23.00	22.50	21.00	20.00
O.-h. billets, Pittsburgh...	23.50	22.50	22.00	20.00
O.-h. sheet bars, P'gh...	24.00	23.50	22.50	21.00
Forging billets, P'gh...	28.00	28.00	27.00	25.00
O.-h. billets, Phila...	30.00	30.00	24.50	22.40
Wire rods, Pittsburgh...	27.00	26.00	25.50	24.50

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia...	1.40	1.35	1.35	1.17½
Iron bars, Pittsburgh...	1.30	1.25	1.25	1.15
Iron bars, Chicago	1.20	1.20	1.20	1.07½
Steel bars, Pittsburgh...	1.30	1.30	1.25	1.20
Steel bars, New York...	1.469	1.469	1.419	1.36
Tank plates, Pittsburgh...	1.25	1.25	1.20	1.20
Tank plates, New York...	1.419	1.419	1.369	1.36
Beams, etc., Pittsburgh...	1.30	1.30	1.25	1.20
Beams, etc., New York...	1.469	1.469	1.419	1.36
Skelp, grooved steel, P'gh	1.25	1.25	1.20	1.15
Skelp, sheared steel, P'gh	1.30	1.30	1.25	1.20
Steel hoops, Pittsburgh...	1.30	1.30	1.30	1.25

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire,	Aug. 11, 1915.	Aug. 4, 1915.	July 14, 1915.	Aug. 12, 1914.
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh.	1.85	1.80	1.75	1.85
Galv. sheets, No. 28, P'gh.	3.85	4.00	4.50	2.85
Wire nails, Pittsburgh...	1.60	1.60	1.60	1.55
Wire nails, Pittsburgh...	1.60	1.55	1.55	1.55
Wire nails, base, P'gh...	1.40	1.40	1.40	1.35
Fence wire, base, P'gh...	2.50	2.50	2.50	1.95
Barb wire, galv., P'gh...				

Old Material.	Per Gross Ton:			
Iron rails, Chicago.....	\$12.25	\$12.25	\$12.25	\$12.00
Iron rails, Philadelphia...	15.50	15.50	15.00	14.00
Carwheels, Chicago.....	11.50	11.50	11.00	11.25
Carwheels, Philadelphia...	13.00	12.75	12.50	11.00
Heavy steel scrap, P'gh.	14.00	13.25	11.75	11.50
Heavy steel scrap, Phila.	13.50	13.00	12.00	10.00
Heavy steel scrap, Ch'go.	11.50	11.25	10.25	9.75
No. 1 cast, Pittsburgh...	12.50	12.00	12.00	11.50
No. 1 cast, Philadelphia...	13.00	12.50	12.25	12.00
No. 1 cast, Ch'go (net ton)	9.50	9.50	9.25	9.50

Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt...	\$1.50	\$1.50	\$1.60	\$1.70
Furnace coke, future...	1.75	1.75	1.75	1.75
Foundry coke, prompt...	2.00	2.00	2.00	2.25
Foundry coke, future...	2.25	2.25	2.25	2.35

Metals.				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York...	20.00	21.00	22.00	12.87 1/2
Electrolytic copper, N. Y.	17.75	18.25	19.50	12.50
Spelter, St. Louis.....	15.00	17.25	21.75	5.35
Spelter, New York.....	15.25	17.50	22.00	5.50
Lead, St. Louis.....	4.40	4.90	5.50	3.67 1/2
Lead, New York.....	5.30	5.00	5.65	3.85
Tin, New York.....	34.62 1/2	35.50	38.12 1/2	64.25
Antimony, Asiatic, N. Y.	35.30	34.50	36.00	18.00
Tin plate, 100-lb. box, P'gh	\$3.10	\$3.10	\$3.10	\$3.40

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16.9c.; Philadelphia, 15.9c.; Boston, 18.9c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c.; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St. Paul, 32.9c.; Denver, 68.6c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes. The foregoing rates to the Pacific coast are by rail. The rate via New York and the Panama Canal has no stability, being dependent on vessel charges.

Plates.—Tank plates, 1/4 in. thick, 6 1/4 in. up to 100 in. wide, 1.25c. base net cash, 30 days. Following are stipulations prescribed by manufacturers:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated Feb. 4, 1902, or equivalent, 1/4 in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered 1/4-in. plates. Plates over 72 in. wide must be ordered 3/4 in. thick on edge or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gage or weight to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gages under 1/4 in. to and including 3-16 in.	.10
Gages under 3-16 in. to and including No. 8.	.15
Gages under No. 8 to and including No. 9.	.25
Gages under No. 9 to and including No. 10.	.30
Gages under No. 10 to and including No. 12.	.40
Sketches (including straight taper plates), 3 ft. and over	.10
Complete circles, 3 ft. in diameter and over.	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel.	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive.	.05
Widths over 110 in. up to 115 in., inclusive.	.10
Widths over 115 in. up to 120 in., inclusive.	.15
Widths over 120 in. up to 125 in., inclusive.	.25
Widths over 125 in. up to 130 in., inclusive.	.50
Widths over 130 in.	1.00
Cutting to lengths under 3 ft. to 2 ft., inclusive.	.25
Cutting to lengths under 2 ft. to 1 ft., inclusive.	.50
Cutting to lengths under 1 ft.	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

Wire Products.—Prices to jobbers: Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent discount in 10 days, carload lots, annealed, \$1.40; galvanized, \$2.20. Galvanized barb wire and staples, \$2.50; painted, \$1.70. Wire nails, \$1.60. Galvanized nails, 1 in. and longer, \$1.75 advance over base price; shorter than 1 in., \$2.25 advance over base price. Woven wire fencing, 69 per cent off list for carloads; 68 off for 1000-rod lots; 67 off for less than 1000-rod lots.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Nos.	0 to 9	10	11	12	12 1/2	13	14	15	16
Annealed	\$1.55	\$1.60	\$1.65	\$1.70	\$1.80	\$1.90	\$2.00	\$2.10	\$2.20
Galvanized	2.45	2.50	2.55	2.60	2.70	2.80	3.10	3.20	

Plain Wire, per 100 lb.

Wire Rods.—Bessemer, open-hearth and chain rods, \$27 to \$28.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles 3 to 6 in. on one or both legs, 1/4 in. thick and over, and zeos, 3 in. and over, 1.30c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in., on one or both legs.	.10
Angles, 3 in. on one or both legs less than 1/4 in. thick, as per steel bar card, Sept. 1, 1909.	.70
Tees, structural sizes (except elevator, handrail, car truck and conductor rail).	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909.	.20 to .80
Deck beams and bulb angles	.30
Handrail tees	.75
Cutting to lengths under 3 ft., to 2 ft. inclusive.	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive.	.50
Cutting to lengths, under 1 ft.	1.55
No charge for cutting to lengths 3 ft. and over.	

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card in effect from June 17, 1915, all full weight:

Steel		Butt Weld		Iron	
Inches	Black	Galv.	Inches	Black	Galv.
1/8, 1/4 and 3/8	72	40 1/2	1/8 and 1/4	64	31
1/2	76	53 1/2	3/8	64	31
3/4 to 3	79	57 1/2	1/2	68	41
			3/4 to 2 1/2	71	46
Lap Weld					
2	76	54 1/2	1 1/4	55	30
2 1/2 to 6	78	56 1/2	1 1/2	66	41
7 to 12	76	54 1/2	2	67	43
13 and 14	62 1/2		2 1/2 to 4	69	46
15	60		4 1/2 to 6	69	46
			7 to 12	67	46
Reamed and Drifted					
1 to 3, butt	77	55 1/2	1 to 1 1/2, butt	69	44
2, lap	74	52 1/2	2, butt	69	44
2 1/2 to 6, lap	76	54 1/2	1 1/4, lap	53	28
			1 1/2, lap	64	39
			2, lap	65	41
			2 1/2 to 4, lap	67	44
Butt Weld, extra strong, plain ends					
1/8, 1/4 and 3/8	67	43 1/2	3/8	61	37
1/2	72	52 1/2	1/2	66	45
3/4 to 1 1/2	76	56 1/2	3/4 to 1 1/2	70	47
2 to 3	77	57 1/2	2 and 2 1/2	71	48
Lap Weld, extra strong, plain ends					
2	73	51 1/2	1 1/2	65	42
2 1/2 to 4	75	53 1/2	2	67	43
4 1/2 to 6	74	52 1/2	2 1/2 to 4	69	46
7 to 8	68	46 1/2	4 1/2 to 6	68	45
9 to 12	63	41 1/2	7 to 8	61	40
			9 to 12	56	35
Butt Weld, double extra strong, plain ends					
1/8	62	42 1/2	1/8	56	34
3/4 to 1 1/2	65	45 1/2	3/4 to 1 1/2	59	37
2 to 2 1/2	67	47 1/2	2 and 2 1/2	61	39
Lap Weld, double extra strong, plain ends					
2	63	48 1/2	2	57	34
2 1/2 to 4	65	45 1/2	2 1/2 to 4	59	39
4 1/2 to 6	64	44 1/2	4 1/2 to 6	58	38
7 to 8	58	36 1/2	7 to 8	51	29

To the large jobbing trade an additional 5 per cent is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts on less than carloads, f.o.b. Pittsburgh, freight to destination added, in effect from July 16, 1915.

Lap Welded Steel	Standard Charcoal Iron
1 1/4 and 2 in.	50
2 1/4 in.	47
2 1/2 to 2 3/4 in.	54
3 and 3 1/4 in.	58
3 1/2 and 4 1/2 in.	60
5 and 6 in.	54
7 to 13 in.	62

Locomotive and steamship special charcoal grades bring higher prices.

1 1/4 in., over 18 ft., 10 per cent net extra.

2 in. and larger, over 22 ft., 10 per cent net extra.

Sheets.—Makers' prices for mill shipment on sheets of U. S. Standard gage, in carload and larger lots, on which jobbers charge the usual advance for small lots

from store, are as follows, f.o.b. Pittsburgh, terms 30 days net, or 2 per cent cash discount in 10 days from date of invoice.

Blue Annealed Sheets

	Cents per lb.
Nos. 3 to 8.....	1.30 to 1.45
Nos. 9 to 10.....	1.35 to 1.50
Nos. 11 and 12.....	1.40 to 1.55
Nos. 13 and 14.....	1.50 to 1.65
Nos. 15 and 16.....	1.60 to 1.75

Box Annealed Sheets, Cold Rolled

	Cents per lb.
Nos. 10 and 11.....	1.50 to 1.55
No. 12.....	1.50 to 1.55
Nos. 13 and 14.....	1.55 to 1.60
Nos. 15 and 16.....	1.60 to 1.65
Nos. 17 to 21.....	1.65 to 1.70
Nos. 22 and 24.....	1.70 to 1.75
Nos. 25 and 26.....	1.75 to 1.80
No. 27.....	1.80 to 1.85
No. 28.....	1.85 to 1.90
No. 29.....	1.90 to 1.95
No. 30.....	2.00 to 2.05

Galvanized Sheets of Black Sheet Gage

	Cents per lb.
Nos. 10 and 11.....	2.85 to 3.00
No. 12.....	2.95 to 3.10
Nos. 13 and 14.....	2.95 to 3.10
Nos. 15 and 16.....	3.05 to 3.20
Nos. 17 to 21.....	3.20 to 3.35
Nos. 22 and 24.....	3.40 to 3.55
Nos. 25 and 26.....	3.55 to 3.70
No. 27.....	3.70 to 3.85
No. 28.....	3.85 to 4.00
No. 29.....	4.00 to 4.15
No. 30.....	4.15 to 4.30

Pittsburgh

PITTSBURGH, PA., Aug. 10, 1915.

Interest in the past week has centered largely on the local pig-iron market, which has shown a spectacular advance of about \$1 per ton on Bessemer and basic and 50c. to 75c. on foundry. Everybody is predicting still further advances. The higher prices of steel-making pig iron are due to the heavy demand for Bessemer and open-hearth steel, particularly the latter. A sudden demand for Bessemer and basic iron has sprung up from nearly all steel-making centers. Unconfirmed reports are that the Carnegie Steel Company has bought a large amount of basic iron in the Cleveland district to be used in steel works of the American Steel & Wire Company there. The market on steel billets and sheet bars is very strong. Billets have sold at \$23 and higher and small billets at \$24.50, Youngstown. Local makers are not selling any billets or sheet bars and are getting further behind on deliveries. Prices on black sheets are about \$1 per ton higher, but galvanized sheets are weak, due to the severe decline in spelter. Scrap has moved up in sympathy with steel-making pig iron, best grades of heavy melting steel having sold at close to \$15, delivered. Coke is still lagging, with very little inquiry. Prices on shapes and bars seem very firm at 1.30c., with a few mills still naming 1.25c. on plates. The whole situation is very strong, with some indications of a run-away market on pig iron and scrap. If the railroads should come in at this time and make heavy purchases of track materials it would intensify the situation, and predictions are made that in that case prices on pig iron and finished steel would go up \$5 to \$6 per ton or more. The opinion is expressed that the railroads have waited too long, and if they do come in the market as buyers they will put the market up on themselves very rapidly. Leading steel mills here are all running to 100 per cent of capacity and have work ahead for two or three months. The full extent of the buying of war munitions and the way it has crowded the steel mills with orders is only now being realized.

Pig Iron.—Sensational advances in Bessemer, basic and to some extent in foundry iron have taken place in the past week, and the market looks as though it would go still higher. Early last week Bessemer iron was sold for the remainder of the year at \$14.25 to \$14.40, but the market suddenly started up and as high as \$15 has been paid. A week ago basic was \$13, and it has since sold up to \$14, Valley furnace. Foundry iron has moved up 50c. to 75c. per ton and there has been free buying. We note sales of 5000 tons of Bessemer iron for remainder of the year at \$14.40; 3000 tons, \$14.55; 3000 tons,

\$14.80; 1500 tons, \$14.75; 1500 tons, \$15, and 2000 tons, \$15, all at Valley furnace. Sales of basic have been 3000 tons at \$14; 1000 tons, \$14; 2000 tons, \$13.50; 1500 tons of off-basic, \$13, and 2000 tons, \$13.50, all at Valley furnace. Sellers are now asking \$15 for Bessemer and \$14 for basic, and will not sell for delivery in last quarter at these prices. The Standard Sanitary Mfg. Company bought late last week 20,000 tons of Northern No. 2 foundry iron for its Pittsburgh and New Brighton works, for which slightly above \$13 at furnace was paid. Some furnaces refused to quote on the order on account of deliveries being so far ahead. The United Steel Company, Canton, Ohio, is reported in the market for 15,000 tons of basic for first quarter, and the Whitaker-Glessner Company, Wheeling, W. Va., for 20,000 tons of basic for delivery in first half of next year for its Portsmouth, Ohio, works. We quote: Standard Bessemer iron, \$15; basic, \$14; No. 2 foundry, \$13.25 to \$13.50; gray forge, \$13 to \$13.25; malleable Bessemer, \$13.25 to \$13.50, all at Valley furnace, the freight rate for delivery in the Cleveland and Pittsburgh districts being 95c. per ton.

Billets and Sheet Bars.—We note a sale of 2000 tons of small open-hearth billets at \$24.50, Youngstown, Ohio. The new demand for billets and sheet bars is only for odd lots, mostly for prompt shipment, consumers being covered by regular contracts. The shortage in supply of open-hearth steel is getting more acute. Bessemer steel has not advanced in sympathy with open-hearth, and can be had at 50c. to \$1 per ton less. One local steel mill, that heretofore has made its own ingot molds, has stopped making these and is diverting the pig iron to its steel works. It has placed a contract with a maker of ingot molds for its entire supply for the remainder of this year. Under present conditions it is difficult to quote accurately, but prices ruling, based on recent sales of billets and sheet bars, are about as follows: Bessemer billets, \$22.50; open-hearth billets, \$23.50; Bessemer sheet bars, \$23; open-hearth sheet bars, \$24, Youngstown. Bessemer billets, \$23; open-hearth billets, \$23.50; Bessemer sheet bars, \$23.50 to \$24, and open-hearth sheet bars, \$24 to \$24.50, f.o.b. Pittsburgh mills. Forging billets are up another \$1 per ton, and have sold as high as \$29. We quote forging billets at \$29 for sizes up to but not including 10 x 10 in., and for carbons up to 0.25, the regular extras being charged for larger sizes and higher carbons. Forging billets running above 0.25 and up to 0.60 carbon take \$1 per ton extra. Axle billets are held at \$26.

Ferroalloys.—The scarcity in supply of ferromanganese and the difficulty in getting deliveries on contracts reported from some steel-making centers are not reflected here. Local steel mills report they are getting fairly good deliveries on ferromanganese and when they run short are able to buy in carload lots from stock at \$100 to \$105 per ton for 80 per cent English ferromanganese, delivered Pittsburgh. Several local dealers are freely offering 80 per cent English ferromanganese for prompt delivery at \$100 per ton, f.o.b. Pittsburgh. We quote 50 per cent ferrosilicon in lots up to 100 tons, at \$73; over 100 tons to 600 tons, \$72, and over 600 tons, \$71, delivered in the Pittsburgh district. We quote 10 per cent Bessemer ferrosilicon at \$17.50; 11 per cent, \$18.50; 12 per cent, \$19.50, all f.o.b. cars at furnace, Ashland, Ky., Jackson, or New Straitsville, Ohio, each of these points having a rate to Pittsburgh of \$2 per gross ton. We quote 20 per cent spiegeleisen at \$25 at furnace. We quote ferrotitanium at 8c. per lb. in carloads, 10c. in 2000-lb. lots and over, and 12½c. in smaller lots.

Structural Material.—Fabricators report a fair amount of new inquiry, but still complain of the low prices ruling for fabricated work. The McClintic-Marshall Company has taken about 2500 tons for new steel buildings for the New York Shipbuilding Company, Camden, N. J., 500 to 600 tons of steel for city bridges in Philadelphia and 320 tons for a Pennsylvania Railroad bridge near Erie, Pa. Prices are very firm, and we quote beams and channels up to 18 in. at 1.30c., f.o.b. Pittsburgh, for delivery over remainder of this year.

Plates.—The market seems to be getting firmer, and nearly all mills are now quoting 1.30c., but on a very desirable specification probably some of the smaller mills would name 1.25c. The larger local plate mills report they are filled up for two or three months. Few inquiries for cars are light, and no large orders have been placed. The Pressed Steel Car Company has taken 50 mine cars for the Crystal Coal & Coke Company, and the Buffalo, Rochester & Pittsburgh is in the market for 1000 steel hoppers. The Chesapeake Ohio has placed 50 cabooses with the American Car Foundry Company. We quote plates ¼-in. and heavier at 1.25c. to 1.30c., but it would take a very desirable order to get the lower price.

Steel Rails.—Only small orders for standard sections are being placed and for prompt delivery. The steel mills are so well filled up with war munition orders that it is doubtful if they could turn out in reasonable time any large orders for steel rails. The new demand for light rails is active from the coal-mining companies, but from the traction interests is quiet. The Carnegie Steel Company received new orders and specifications in the past week for about 500 tons. We quote standard section rails of Bessemer stock at 1.25c., and of open-hearth, 1.34c., f.o.b. Pittsburgh. We quote light rails as follows, in carload lots: 8 and 10-lb. sections, 1.275c.; 12 and 14-lb., 1.25c.; 16 and 20-lb., 1.175c.; 25, 30, 35, 40, and 45-lb. sections, 1.125c. The prices of light rails are materially shaded on large lots.

Tin Plate.—Specifications have quieted down a good deal with most mills, but one or two makers still report orders coming in freely and that they have work ahead for four or five weeks. The export demand is active and good sized shipments are being made to Asia, South America and elsewhere. Most of the larger mills are still operating close to 100 per cent of capacity. Domestic demand is dull and only for small lots, on which we quote from \$3.10 to \$3.20 per base box for 14 x 20 coke plates.

Sheets.—Prices on blue annealed and black sheets are firm, but on galvanized are much weaker and likely to be lower. Prices of spelter have declined materially and makers who have galvanized sheets in stock are trying to dispose of them as fast as possible. Sales of galvanized sheets have been made as low as 3.85c. and up to 4c. and 4.25c. for No. 28. On blue annealed sales of Nos. 9 and 10 have been made at 1.50c., but there are still a few sellers naming 1.35c. The minimum on black sheets, No. 28, now seems to be 1.85c., and several mills report large sales at that figure for this month and September shipment. For last quarter 1.90c. is being named. We quote galvanized sheets, No. 28, 3.85c. to 4c., depending on the customer, the quantity and the deliveries. We quote No. 28 Bessemer black sheets at 1.85c. to 1.90c.; Nos. 9 and 10 blue annealed sheets, 1.35c. to 1.50c. No. 30 black plate, tin-mill sizes, H. R. & A., 1.95c.; No. 28, 1.90c.; Nos. 27, 26 and 25, 1.85c.; Nos. 22 to 24, 1.80c.; Nos. 17 to 21, 1.75c.; Nos. 15 and 16, 1.70c. The above prices are for carload lots, f.o.b. at maker's mill, jobbers charging the usual advances for small lots from store.

Wire Rods.—While the new demand is not heavy, specifications against contracts are active and rod mills are sold up for the remainder of the year. There is still some foreign inquiry, one new in the market being for 2000 tons from England, running 0.50 to 0.60 carbon, on which local makers have quoted \$3 to \$4 per ton over the price for ordinary carbons. Prices are very firm. We quote Bessemer, open-hearth and chain rods at \$27 to \$28, f.o.b. Pittsburgh.

Wire Products.—The wire market is very active, but the new demand for wire nails is only fair. Heavy foreign shipments of barb wire and plain wire are being made and the output of local mills is sold up for the remainder of this year. Some contracts taken at the \$1.55 base for wire nails are still running, but on new orders the market is firm at \$1.60. Prices to the large trade are as follows: Wire nails, \$1.60; galvanized nails 1 in. and longer taking an ad-

vance over this price of \$1.75, and shorter than 1 in., \$2.25. Some mills are asking higher prices on galvanized nails. Plain annealed wire is \$1.40; galvanized barb wire and fence staples, \$2.50; painted barb wire, \$1.70; polished fence staples, \$1.70, all f.o.b. Pittsburgh, with freight added to point of delivery, terms sixty days net, less 2 per cent off for cash in ten days. Prices on woven wire fencing are 69 per cent off in carload lots, 68 per cent on 1000-rod lots, and 67 per cent on small lots, f.o.b. Pittsburgh.

Skelp.—The new demand is quiet, but the mills are pretty well filled up with work and prices are firm. We quote grooved steel skelp at 1.25c. to 1.30c.; sheared steel skelp, 1.30c. to 1.35c.; grooved iron skelp, 1.65c. to 1.70c., and sheared iron skelp, 1.75c. to 1.80c., delivered to consumers' mills in the Pittsburgh district.

Railroad Spikes.—The Pennsylvania Lines West has placed about 20,000 kegs, one local interest getting 10,000 and the remainder being divided among several other makers. The Chicago & Western Indiana is in the market for 600 kegs. Reports that Russia had placed an order for 7500 tons (75,000 kegs) of spikes in this country are not confirmed. Russia has been negotiating for this quantity of spikes for three months or more, but, so far as known, the order has not been definitely placed. Prices are firm, and we quote standard sizes of railroad spikes at \$1.45, and smaller railroad and boat spikes, \$1.55 per 100 lb., f.o.b. Pittsburgh.

Cold-Rolled Strip Steel.—Probably 90 per cent of the users of cold-rolled strip steel are covered by contracts over remainder of the year at \$2.75 and \$2.85 base. On new orders makers are quoting \$2.85 base, and this is minimum; in some cases \$2.90 base being obtained for small lots. We quote hard-rolled steel, 1½-in. and wider, under 0.20 carbon, sheared or natural mill edge, per 100 lb., \$2.85, delivered. Extras, which are standard among all mills, are as follows:

Thickness, in.	Extras for thickness	Extras for soft or intermediate temper	Extras for straightening and cutting to lengths not less than 24 in.
0.160 and heavier	Base	\$0.25	\$0.10
0.099 to 0.050	\$0.05	0.25	0.15
0.049 to 0.035	0.20	0.25	0.15
0.034 to 0.031	0.35	0.40	0.25
0.030 to 0.025	0.45	0.40	0.40
0.024 to 0.020	0.55	0.40	0.50
0.019 to 0.017	0.85	0.50	1.10
0.016 to 0.015	1.25	0.50	1.10
0.014 to 0.013	1.95	0.50	1.25
0.012	2.30	0.50	coils only
0.011	2.65	0.50	coils only
0.010	3.00	0.50	coils only

Rivets.—Both domestic and foreign demand are heavy, England placing orders with local makers for large lots of rivets to be shipped as soon as possible. A local maker has orders now for five or six carloads to go to that country. Prices are higher. We now quote buttonhead structural rivets at \$1.60, and cone-head boiler rivets at \$1.70 per 100 lb., f.o.b. Pittsburgh, small lots bringing about 10c. advance.

Hoops, Bands and Cotton Ties.—Through an error in telegraphic transmission, it was stated in this report last week that the Carnegie and Pittsburgh steel companies had advanced prices on hoops to 1.50c. This should have read 1.40c. Prices on hoops and bands are very firm, some makers asking 1.35c. to 1.40c. for last quarter. The new demand is active, and specifications against contracts are coming in very freely. We quote steel hoops at 1.30c. to 1.40c., and bands at 1.30c. for this month and September shipment, the latter taking the steel bar card extras. Nearly all consumers of cotton ties are covered, and the price for August shipment is 85½c. per bundle.

Iron and Steel Bars.—The new demand for steel rounds for shrapnel purposes continues enormously heavy, but local steel-bar mills have about reached the point where they cannot take any more of this business, as they are practically filled up for the remainder of the year. It is said one order for 200,000 tons of steel rounds was submitted to steel-bar mills here last week, but was turned down as they could not make the deliveries wanted. Up to 3.25c. has been paid for

steel rounds where prompt delivery was a condition of the contract. Specifications against contracts for merchant steel bars are heavy, and the new demand is very active. There is also a more active demand for iron bars, and prices are slightly higher. We quote steel bars at 1.30c. for third quarter; common iron bars, 1.30c.; refined iron bars, 1.35c. to 1.40c., and test iron bars, 1.40c. to 1.45c., all f.o.b. Pittsburgh.

Nuts and Bolts.—As yet the expected advance in prices of bolts has not been made, but on nuts some sizes are up about 5 per cent. The foreign demand for bolts is very active, large quantities going to England and France. On domestic orders, where the customer must have prompt shipment, slight advances are obtained. Discounts to the large trade are as follows:

U. S. S. Cold Punched Blank and Tapped, Chamfered, Trimmed and Redmed

1½ in. and smaller, hex.....7.4c. per lb. off
¾ in. and larger, hex.....6.9c. per lb. off
Square, all sizes.....5.5c. per lb. off

Semi-Finished Tapped

¾ in. and smaller, hex.....85-10-5 off
¾ in. and larger, hex.....85-5 off

Black Bulk Rivets

7/16 x 6½, smaller and shorter.....80-10 off

Package Rivets 1000 Pcs.

Black, metallic tinned and tin plated....75-10-10 off

Discounts on bolts to the large trade, effective from July 21, are as follows:

Machine bolts, h. p. nuts, ¾ x 4 in., smaller and shorter, rolled, 75, 10, 10 & 10; smaller and shorter, cut, 75, 10, 10 & 5; larger or longer, 75 & 10. Machine bolts, C. P. C. & T. nuts, ¾ x 4 in., smaller and shorter, 75, 10 & 7½; larger or longer, 70, 10 & 7½. Common carriage bolts, ¾ x 6 in., smaller and shorter, rolled, 75, 10, 10 & 5; smaller and shorter, cut, 75, 10 & 10; larger or longer, 75 & 5. Bolts without nuts, 6 in. and shorter, extra 10; longer lengths, extra, 5. Blank bolts, 75 & 10. Bolt ends with h. p. nuts, 75 & 10; C. P. C. & T. nuts, 70, 10 & 7½. Gimlet point coach screws and cone point lag screws, 80 & 15. Nuts, blank or tapped, h. p. square, 6c. lb. off; h. p. hexagon, 6.70c. lb. off; C. P. C. & T. square, 5.50c. lb. off; hexagon, ¾ in. and up, 7c. lb. off; smaller, 7.50c. lb. off; C. P. plain, square, 5.40c. lb. off; hexagon, 5.80c. lb. off; C. P. semi-finished, hexagon, ¾ in. and up, 85 & 10; smaller, 85, 10 & 10.

Merchant Steel.—New demand is heavy and local makers are filling foreign orders for considerable quantities. Prices are very firm, and on small lots are as follows: Iron finished tire ½ x 1½ in. and larger, 1.50c. base; under ½ x 1½ in., 1.65c.; planished tire, 1.70c.; channel tire, ¾ to ¾ and 1 in., 2c. to 2.10c.; 1½ in. and larger, 2.10c.; toe calk, 2.10c. to 2.20c. base; flat sleigh shoe, 1.85c.; concave and convex, 190c.; cutter shoe, tapered or bent, 2.40c. to 2.50c.; spring steel, 2.10c. to 2.20c.; machinery steel, smooth finish, 1.90c.

Wrought Pipe.—The new demand for merchant pipe is only fair and for oil country goods continues very dull. The J. G. White Corporation, New York City, is in the market for 120 miles of 8-in. line pipe, and it is understood this line, if placed, is to be laid in the California oil fields. It is generally expected that a reduction in the price of galvanized iron and steel pipe may be made in the near future on account of the severe decline in prices of spelter. Discounts on black iron and steel pipe are being firmly held, but on galvanized are being shaded.

Boiler Tubes.—New demand is fairly active for locomotive and merchant tubes, and discounts on steel tubes are firm, but on charcoal iron tubes are being shaded.

Coke.—Prices on coke continue soft, especially for prompt delivery. The Lackawanna Steel Company, which was in the market for 10,000 tons of coke per month for last quarter of this year, has closed with a local interest for about half of this amount and will likely place the rest of it this week. We quote standard grades of blast furnace coke for prompt shipment at \$1.50 to \$1.60; on contracts for delivery up to Jan. 1, \$1.75 to \$1.85; standard 72-hr. foundry coke, \$2 to \$2.25 for prompt shipment, and \$2.25 to \$2.50 on contracts, all per net ton at oven. The Connellsville Courier reports the output of coke in the upper and lower Con-

nellsville regions for the week ended July 31 as 377,000 net tons, an increase over the previous week of nearly 10,000 tons.

Old Material.—A sharp advance on nearly all kinds of scrap, particularly steel-making scrap, has taken place the past week and the market is very strong. It is understood that the leading local consumer secured practically all of the steel scrap in the Pennsylvania Railroad list, paying about \$14.50 delivered. Reports of sales of heavy steel scrap at \$15 are not confirmed but several consumers are bidding \$14 and would buy at that price. Dealers are now quoting on nearly all grades of scrap from 50c. to 75c. per ton above the week, naming the following prices per gross ton:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery.....	\$14.00 to \$14.50
Compressed side and end sheet scrap.....	12.75 to 13.00
No. 1 foundry cast.....	12.50 to 12.75
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district.....	10.75 to 11.00
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.....	13.50 to 13.75
No. 1 railroad malleable stock.....	11.50 to 11.75
Railroad grate bars.....	8.75 to 9.00
Low phosphorus melting stock.....	16.25 to 16.50
Iron car axles.....	18.75 to 19.25
Steel car axles.....	14.50 to 15.00
Locomotive axles, steel.....	19.75 to 20.25
No. 1 busheling scrap.....	10.75 to 11.00
No. 2 busheling scrap.....	8.25 to 8.50
Machine shop turnings.....	8.00 to 8.25
Old carwheels.....	11.75 to 12.00
Cast-iron borings.....	9.00 to 9.25
*Sheet bar crop ends.....	12.50 to 12.75
Old iron rails.....	12.75 to 13.00
No. 1 railroad wrought scrap.....	12.25 to 12.50
Heavy steel axle turnings.....	9.00 to 9.25
Heavy breakable cast scrap.....	11.00 to 11.25

*Shipping point.

Chicago

CHICAGO, ILL., Aug. 10, 1915.

The degree of uncertainty that is now attending the possibility of steel shortage is contributing to more rapid advancement of the market than would obtain were a more accurate analysis of conditions possible. It is not surprising, in view of present quotations, and mill deliveries growing longer by leaps and bounds, that domestic users of plates, shapes and bars with contracts at 1.10c. and 1.15c., some of them running through the third quarter, are specifying at a rate that will absorb the maximum tonnage on which they are protected. With this incentive, much of domestic buying in this market is being determined, as evidenced by the proportion of specifications calling for material in stock lengths. Rail purchases continue very light but Western rail mills appear to be well filled considering the limitations in steel supply. Prices for the fastenings have been advanced. October delivery structural steel is now the earliest obtainable, while the bar mills of the leading interest are rolling in excess of normal capacity. The inconsistencies in the prices of steel in various forms have already been pointed out, but the influence of the stronger production is beginning to be felt, as marked by an advance of \$1 a ton on blue annealed and black sheets and bars from mill, and shapes, plates and bars from scrap. The feature of the pig-iron market is the inquiry for and buying of basic. In the last week 25,000 tons were purchased, and there remains to be closed approximately as much. Prices of scrap are moving upward in response to special demands, the filling of orders for steel scrap distorting the whole trend of the market. A feature of the situation is the buying of steel scrap for export.

Pig Iron.—The feature of this market is the activity in basic iron, the inquiry and buying of foundry and malleable being of about the same character as has prevailed for several weeks. The Scullin Steel Company, St. Louis, has satisfied its requirements, taking 10,000 tons of Northern basic and 5000 tons of Southern. It is stated that a price equivalent to \$13.50, Chi-

was secured for the Northern iron. The inquiry of the National Enameling & Stamping Company for 5000 to 8000 tons is likely to be closed within the next few days. This tonnage, together with another inquiry on which quotations are now being made, makes a total of over 20,000 tons still to be closed. The purchase of 10,000 tons of basic by a wire company of Northern Indiana was divided between Toledo and Detroit furnaces. The market is moving in a way to establish \$13.50 at Chicago furnaces as a minimum quotation, but lower prices than this have been brought out by the business of the past week. The tightening up in the price of silvery irons by the Ohio furnaces and the very limited production of ferro-manganese by local steel company furnaces have placed a premium on foundry irons running high in silicon. The following quotations are for iron delivered at consumption yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace, and do not include a switching charge averaging 50c.

Lake Superior charcoal, Nos. 2 to 5.....	\$15.75
Lake Superior charcoal, No. 1.....	16.25
Lake Superior charcoal, No. 6 and Scotch....	16.75
Northern coke foundry, No. 1.....	\$13.75 to 14.25
Northern coke foundry, No. 2.....	13.25 to 13.75
Northern coke foundry, No. 3.....	12.75 to 13.25
Northern coke, No. 1 f'dry and 1 soft.....	14.75 to 15.25
Northern coke, No. 2 f'dry and 2 soft.....	14.25 to 14.75
Malleable Bessemer.....	13.25 to 13.75
Standard Bessemer.....	17.25
Basic.....	13.25 to 13.75
Low phosphorus.....	20.00 to 20.50
Silvery, 8 per cent.....	18.50 to 18.75
Silvery, 10 per cent.....	19.00 to 19.25

Rails and Track Supplies.—While the Gary works are operating at a rate equivalent to a production of about 50,000 tons a month, to which the limitations of the supply confine it, there are on the books nearly enough orders to fill rolling schedules for the remainder of the year at that rate, and the meeting of prompt delivery requirements presents some difficulty. Orders last week for rails barely exceeded 10,000 tons, the largest individual contract being for 3000 tons. Quotations have been advanced for spikes to a minimum of 1.60c., and for track bolts to a minimum of 1.5c. We quote standard railroad spikes at 1.60c. to 1.8c. base; track bolts with square nuts, 2c. to 2.10c., all, net ton; standard section Bessemer rails, Chicago, 5c. base, open-hearth, 1.34c.; light rails, 25 to 45 lb., 1.1c. to 1.2c.; 16 to 20 lb., 1.12c.; 12 lb., 1.17c.; 8 lb., 1.22c.; angle bars, 1.50c., Chicago.

Structural Material.—Reports indicate that a number of the small contracts on which the structural shops have been figuring were closed last week. A building for Sears, Roebuck & Co., Chicago, went to the Hansell-Elcock Company, requiring 256 tons; the Wisconsin Bridge Company took a viaduct of 632 tons at Omaha; the American Bridge Company was awarded the Western Pacific Railway bridge work and the Great Northern Power Company transmission towers for a total of 354 tons; the Virginia Bridge & Iron Company took the Frisco girder spans, and the South Halsted Street Iron Works the Davidson Hotel at Milwaukee. The Calumet River bridge at Hammond, in which there will be 1000 tons of steel, went to the Penn Bridge Company. Contracts for fabricated steel reported aggregate about 5000 tons, and fabricators also report that, for the smaller jobs now being taken, much better prices are being secured. Fabricators' specifications constitute a fair proportion of the structural steel booked by the mills, but the bulk of the tonnage is filled for in stock lengths. This is but one of the evidences that the rapid advance in the market is leading to the heaviest possible specifications against their low-price contracts which the consumers are able to assume. At the same time fabricating shops, particularly outside of Chicago, secured considerably more business in July than had materialized during several previous months. New car business is of no great consequence, the American Car & Foundry Company having taken 500 center sills for the Chicago Great Western, while the Mount Vernon Car Company has a new order for 600 cars, and Haskell & Barker an order for 500. With respect to deliveries, Chicago mills have

little or nothing to offer prior to October, and from Eastern mills the delivery quotations are even less favorable. The market continues on the basis of 1.30c., Pittsburgh, with considerable talk of 1.35c. We quote for Chicago delivery of structural steel from mill 1.489c.

The price of structural material out of stock has been advanced \$1 a ton, and we quote for Chicago delivery 1.80c.

Plates.—The market with respect to plates has advanced in proportion to the general activity, but conditions are still easier than on shapes and bars. September delivery for plates is not difficult, and 1.439c., Chicago, can still be done. The filling of orders for Canadian delivery and for shipment to the Orient continues steadily. We quote for Chicago delivery of plates from mill 1.439c. to 1.489c.

We record the revision of store prices on plates and quote for Chicago delivery out of stock 1.80c.

Sheets.—Sheet prices are typical of the distorted relationships which have developed among steel products. With but little demand for sheets of any kind, except highly finished sheets for automobile or other special purposes, the price of black sheets at \$1.989c. and blue annealed at 1.539c., Chicago, is exceptionally low by comparison. The Inland Steel Company to-day advanced its price \$1 a ton for both grades. The price of galvanized sheets is difficult to locate accurately, but purchases from mill are of such limited volume as to suggest necessities only. We quote for Chicago delivery from mill, No. 10 blue annealed, 1.539c. to 1.589c.; No. 28 black, 1.989c. to 2.039c.; No. 28 galvanized, 4.139c. to 4.389c.

The demand for sheets out of store appears to have fallen off in keeping with the general lack of interest. We quote for Chicago delivery from jobbers' stock as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 1.95c.; No. 28 black, 2.55c.; No. 28 galvanized, 4.70c.

Bars.—Inquiry for shrapnel bars continues to pile up, and reports of new ammunition contracts closed with manufacturers in this territory grow in number daily. The situation is now crowding the limits of mill capacity to such an extent as to render impossible any marked changes. The bar mills of the leading interest are scheduled for the coming week on the basis of 115 per cent of rated capacity. Billet steel is quite as scarce as bars, and forging billets are quoted \$26 to \$27. The influence of this condition is undoubtedly lending strength both to high-carbon steel and bar-iron prices. The advance to 1.25c. for iron bars by one mill has already been followed by others, and the tonnage still available at 1.20c. is limited. We quote for mill shipment as follows: Bar iron, 1.20c. to 1.25c.; soft steel bars, 1.489c.; hard steel bars, 1.25c.; shafting, in carloads, 65 per cent off; less than carloads, 60 per cent off.

We quote store prices for Chicago delivery: Soft steel bars, 1.70c.; bar iron, 1.70c.; reinforcing bars, 1.70c. base, with 5c. extra for twisting in sizes $\frac{1}{2}$ in. and over and usual card extras for smaller sizes; shafting 55 per cent off.

Rivets and Bolts.—The demand for rivets is only moderately active, but the comparatively low quotation of 1.65c., Chicago, leaves little question as to its firmness. Business in bolts and nuts is for the most part limited to contract specifications. Quotations are as follows: Carriage bolts up to $\frac{3}{4}$ x 6 in., rolled thread, 80-10; cut thread, 80-5; larger sizes, 75-15; machine bolts up to $\frac{3}{4}$ x 4 in., rolled thread, with hot pressed square nuts, 80-15; cut thread, 80-10; larger sizes, 80; gimlet point coach screws, 85; hot pressed nuts, square, \$6 off per cwt.; hexagon, \$7 off per cwt. Structural rivets, $\frac{3}{4}$ to 1 $\frac{1}{4}$ in., 1.75c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

We quote out of store: Structural rivets, 1.95c.; boiler rivets, 2.05c.; machine bolts up to $\frac{3}{4}$ x 4 in., 75-15; larger sizes, 70-10-10; carriage bolts up to $\frac{3}{4}$ x 6 in., 75-10; larger sizes, 70-15 off; hot pressed nuts, square, \$6, and hexagon, \$6.70 off per cwt.

Wire Products.—Makers of wire find their capacity so well filled up that the slowness with which wire products are moving in this territory is not the effective influence with respect to quotations. A growing firmness is to be noted. We quote to jobbers as follows: Plain wire, No. 9 and coarser, base, \$1.589; wire nails,

\$1.739 to \$1.789; painted barb wire, \$1.889; galvanized barb wire, \$2.689; polished staples, \$1.889; galvanized staples, \$2.689, all Chicago.

Cast-Iron Pipe.—The week brought out no contracts of importance other than the formal award of 1200 tons for Kenosha, Wis., to the United States Cast Iron Pipe & Foundry Company. We quote as follows, per net ton, Chicago: Water pipe, 4 in., \$26; 6 to 12 in., \$24; 16 in. and up, \$23.50, with \$1 extra for class A water pipe and gas pipe.

Old Material.—In no other department of the metal market are the novel situations resulting from the demands of foreign business more pointedly in evidence. Scarcely any grade of scrap is to be had at a price in keeping with the influences normally effective. The great demand for steel scrap, for example, carries much material that would otherwise go into busheling or wrought scrap, into shoveling steel, and where busheling can be secured at all, practically as much is asked for it as for steel. The filling of orders calling for the exporting of steel axles to Italy has placed a premium on this material entirely out of keeping with local market conditions, and prices as high as \$13.50 have been paid. The possibility of scarcity of material is also an active factor in the advancement of prices and in influencing purchases which probably would not otherwise be made. The rolling mills are in little need of scrap, but a purchase of about 3500 tons of wrought iron by one interest is reported, and prices up to \$11.25 have been asked. Sharp advances have ruled also in quotations on rerolling rails, although the high-carbon bar mills are far from busy. This week's offerings of scrap from the railroads include 2300 tons from the St. Paul, of which 1000 tons are car-wheels, 1700 tons from the Michigan Central, 1600 from the Pere Marquette and 650 tons from the Soo Line. We have revised our prices and quote for delivery at buyer's works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails	\$12.25 to \$12.50
Old steel rails, rerolling	12.50 to 13.00
Old steel rails, less than 3 ft.	11.75 to 12.25
Relaying rails	19.50 to 20.50
Old car wheels	11.50 to 12.00
Heavy melting steel scrap	11.50 to 11.75
Frogs, switches and guards, cut apart	11.50 to 11.75
Shoveling steel	11.25 to 11.50
Steel axle turnings	8.25 to 8.50
Per Net Ton	
Iron angles and splice bars	\$13.00 to \$13.50
Iron arch bars and transoms	13.50 to 14.00
Steel angle bars	10.25 to 10.50
Iron car axles	14.25 to 14.75
Steel car axles	13.25 to 13.50
No. 1 railroad wrought	10.50 to 10.75
No. 2 railroad wrought	10.00 to 10.50
Cut forge	10.00 to 10.50
No. 1 busheling	8.50 to 9.50
No. 2 busheling	7.50 to 8.50
Steel knuckles and couplers	10.50 to 11.00
Steel springs	10.50 to 11.00
Locomotive tires, smooth	9.75 to 10.00
Machine shop turnings	6.00 to 6.50
Cast borings	5.75 to 6.25
No. 1 boilers, cut to sheets and rings	7.75 to 8.00
Boiler punchings	9.75 to 10.25
No. 1 cast scrap	9.50 to 10.00
Stove plate and light cast scrap	8.50 to 9.00
Grate bars	8.50 to 8.75
Railroad malleable	10.00 to 10.50
Agricultural malleable	8.75 to 9.00
Pipes and flues	7.75 to 8.25

Philadelphia

PHILADELPHIA, PA., Aug. 10, 1915.

The demand for steel in the form of billets, sheet bars, skelp and steel bars is so heavy that the main question confronting the mills is how to make deliveries. Makers of billets, who also are consumers, must further consider the husbanding of their output to meet their own needs. The supply of Bessemer billets is growing tighter, following the stringency in open-hearth steel. Open-hearth billets are irregular in price, depending on the situation in which various makers find themselves. At \$30 and \$32, the local quotations are out of proportion with the prices of various finished materials. Some makers of steel bars are not quoting, preferring to catch up with orders rather than go into the future at present prices. Plates

are in heavy demand. Structural mills are well filled up. The quotation for plates, shapes and bars can be called 1.30c., Pittsburgh, or 1.459c., Philadelphia, although for small lots \$1 per ton more is asked. A large interest is asking the higher price for any quantity. Nail and wire specifications are coming along better. Basic pig iron has sold at \$15.25 delivered in quantities which aggregate between 30,000 and 35,000 tons, while more inquiry is pending. Low phosphorus is brisk. Foundry iron is more active, prices are higher and larger quantities are being taken. Speculators are taking a hand in the activity, though some producers do not encourage business of this sort. Old material of all kinds is higher, and several of the mills are buying steadily, though not in large quantities individually. Domestic ferromanganese has advanced while the foreign source of supply is more uncertain because of the withholding by England of licenses to ship in August.

Pig Iron.—Last Friday and Saturday between 20,000 and 25,000 tons of basic pig iron was purchased by eastern Pennsylvania consumers. The price paid was \$15 delivered, which was an advance of \$1 per ton over the last previous transaction. This week there was an additional sale of 10,000 tons, which went at \$15.25 delivered, and sellers thereafter announced their minimum to be \$15.50. Steel-making iron is scarce, and it is hardly probable that any large additional tonnage could be obtained under the new quotations. One seller quotes \$15.60 to \$15.75. There is inquiry for several thousand tons still before the market. Some producers are sold up to the end of the year, and are unwilling to consider next year at present prices. Several thousand tons of standard low phosphorus have been bought at prices ranging from \$21.50 to \$22 delivered. Lebanon low phosphorus is moving well at about \$17.50, furnace. The situation in foundry iron shows a great improvement as compared with that of two or three weeks ago, both as regards volume of sales and prices, but it must be admitted that the general foundry trade is not enjoying a prosperity corresponding with that of the steel mills. At the same time, the percentage of busy foundries is steadily increasing, and founders are disposed to buy iron for future needs. Speculators are active. An indication of the change which has come over the market is the larger quantities being purchased. Where buying in small lots had become almost a habit, sales of 1500, 2500 and 3000 tons, these being actual figures, are now recurrent. The Pennsylvania Railroad is in the market for 4000 tons of miscellaneous irons for its fourth quarter needs. Of the total 1400 tons is to be foundry iron. Prices are higher, but a definite level is rather difficult to establish for the reason that as soon as a producer becomes well filled up he advances his quotations. For eastern Pennsylvania No. 2 X, \$14.75 to \$15.25 seems a conservative range. Some sellers quote \$15 to \$15.50, and others are asking \$14.75, furnace, or about \$15.54, delivered. A purchase of 350 tons of Southern foundry iron was made at \$10.50 Birmingham, and more could be sold if sellers would agree to next year's delivery. Since the Aug. 1 contracts have been placed with one furnace for 4000 tons of Virginia iron, the July sales of which totaled 6000 tons, the prices of Virginia iron are firm, but no higher. Quotations for standard brands, delivered in buyers' yards, shipment ranging from third quarter to last half, range about as follows:

Eastern Penna. No. 2 X, foundry	\$14.75 to \$15.25
Eastern Penna. No. 2, plain	14.50 to 15.00
Virginia, No. 2 X, foundry	15.25 to 15.75
Virginia, No. 2, plain	15.00 to 15.25
Gray, forge	15.00 to 15.50
Basic	15.25 to 15.50
Standard low phosphorous	21.50 to 22.00

Iron Ore.—There is no inquiry for foreign ore. Importations of the week ended Aug. 7 consisted of 15,700 tons from Cuba and 5938 tons from Spain.

Ferroalloys.—The nominal quotation for English 80 per cent ferromanganese continues at \$100, seaboard. The British Government has issued no license for shipments in August, probably because of its requirement that home producers and consumers shall accumulate a supply of manganese ore or ferromanganese.

Domestic makers of ferromanganese, who have heretofore sold at \$115, furnace, are now asking \$132. Anxiety over the future supply is becoming more acute. The quotations for 50 per cent ferro-silicon range from \$73 to \$75, Pittsburgh, according to quantity. In the week, there arrived 400 tons of English ferromanganese, shipment having been made in July.

Rails.—The Southern Railway has ordered 4000 tons of rails from the Pennsylvania Steel Company.

Bars.—The heavy demand for steel bars to be used in making shrapnel, high explosive shells and other munitions is the big feature. The Pennsylvania Steel Company has sold 4000 tons to the Westinghouse Electric & Mfg. Company to be used in the manufacture of rifles at Chicopee Falls, Mass. The latter company first received an order for 1,000,000 rifles, followed by another for 800,000. Steel for the second lot has not been placed. Prices are exceedingly stiff, and while 1.459c., Philadelphia, can be done on ordinary steel bars, one large maker quotes 1.509c., Philadelphia, and is not looking for fourth quarter business, stating that it has a back-log which warrants slow procedure. Another large maker is not quoting at all, and did not take up an inquiry for 370 tons of reinforcing bars required by the Isthmian Canal Commission. Iron bars are quoted at 1.33c., Eastern mill, or 1.40c., Philadelphia.

Plates.—The order books of representative makers are in better shape than at any time in the last two or three years, and, here again, fourth quarter business is not sought. The quotation is strong at 1.459c., Philadelphia. The demand is coming from all directions, including locomotive builders, bridge shops and shipyards. An order for a merchant ship of about 6000 tons has been placed with the William Cramp & Sons Ship & Engine Building Company. The only trouble plate makers have is making deliveries as desired.

Structural Material.—The quotation is strong at 1.459c., Philadelphia, with indefinite promises of shipment. Most of the larger bridge shops are reported to be busier, though work of this class has not come heavily to one large interest here. On carload lots of miscellaneous material 1.509c., Philadelphia, is asked and obtained. A good part of the orders filling eastern Pennsylvania shops is from munitions plants, and the greater capacity which these have made necessary elsewhere. Bids were submitted yesterday on 600 tons required for the substructure of the McKean Street municipal pier, this city. The specifications for the superstructure have not yet appeared. The Lehigh car shops have an inquiry out for 1800 tons of car shapes. The Pennsylvania Railroad steadily asks quotations on about 200 tons of small bridges each week.

Sheets.—The demand for sheets is good, but makers are disappointed that prices do not advance more uniformly in view of the high cost of billets. For third quarter shipments quotations on No. 10 blue annealed range from 1.609c. to 1.659c., Philadelphia, though Western makers are taking less.

Billets.—Quotations are very irregular, much depending on ability to make deliveries. Open-hearth rolling billets range from \$30 to \$32, Philadelphia, as a rule, but sales have been made at higher levels. Forging steel is quoted at \$35 to \$40, according to specifications. One large producer has no open-hearth steel to sell, and all makers, who are consumers also, say they must husband their supply. An inquiry for 25,000 tons is on the point of closing. Bessemer billets, though plentiful enough when the drive in steel began, are growing scarce also.

Coke.—Furnace coke for early shipment is quoted at \$1.80 per net ton at oven, and at \$1.90 to \$2 for delivery through the remainder of the year. An Eastern furnace has paid \$1.90. Foundry coke continues quiet and relatively lower than furnace, at \$2.10 to \$2.40 for prompt and \$2.25 to \$2.75 for contract.

Old Material.—Several of the mills are buying steadily and will pay the minimum price asked, while others are holding back. Meanwhile prices continue to advance steadily, and lots of 500 and 1000 tons of

heavy melting steel have been taken at \$13.50. Railroad wrought has sold at \$14.50. The following price ranges represent the market and what dealers are asking. Quotations for delivery in buyers' yards in this district, covering eastern Pennsylvania and taking freight rates from 35c. to \$1.35 per gross ton, are as follows:

No. 1 heavy melting steel.....	\$13.50 to \$14.00
Old steel rails, rerolling.....	14.00 to 14.50
Low phos. heavy melting steel scrap.	16.00 to 16.50
Old steel axles.....	16.50 to 17.00
Old iron axles.....	20.00 to 21.00
Old iron rails.....	15.50 to 16.00
Old carwheels.....	13.00 to 13.50
No. 1 railroad wrought.....	14.25 to 14.75
Wrought-iron pipe.....	12.00 to 12.50
No. 1 forge fire.....	9.50 to 10.00
Bundled sheets.....	9.50 to 10.00
No. 2 busheling.....	8.50 to 9.00
Machine shop turnings.....	9.25 to 9.75
Cast borings.....	9.25 to 9.75
No. 1 cast.....	13.00 to 13.50
Grate bars, railroad.....	10.00 to 10.50
Stove plate.....	10.00 to 10.50
Railroad malleable.....	10.00 to 10.50

Cincinnati

CINCINNATI, OHIO, Aug. 11, 1915.—(By Wire.)

Pig Iron.—Both Southern and Northern iron have registered sharp advances this week. The former is now quoted at \$11, Birmingham basis, for this year's shipment, and the latter at \$14, Iron-ton. Quite a number of inquiries are for next year's delivery. A northern Ohio melter wants 500 tons and there are quite a number of inquiries from Ohio and Indiana consumers for quantities ranging from 100 to 1000 tons. Northern furnaces are generally willing to accept business at \$14.25 f.o.b. furnace, for the first quarter and \$14.50 for the second. Quite a number of Southern foundry iron sales were made for last half shipment before the price was advanced to \$11, but only a few scattered lots of special iron were bought at this figure by nearby melters. A local foundry took last week 600 tons of Southern iron at the old quotation. A central Ohio firm wants 1200 tons of basic and 500 tons of Northern foundry iron for first half shipment and a Western melter is asking for 1000 tons of malleable for the same delivery. Ohio silvery irons have been more active, and based on an 8 per cent analysis they are firm at \$16 at furnace for this year's shipment and \$16.50 for the first half of next year. An inquiry from Michigan calls for 600 tons of high silicon iron for shipment during the remainder of the year and a like quantity for first half movement. A southern Ohio steel company bought approximately 20,000 tons of basic from a producer in the same territory and an Indiana basic consumer placed an order with a Lake furnace for 10,000 tons, shipments on both having leave to extend into next year. Based on freight rates of \$2.90 from Birmingham and \$1.26 from Iron-ton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft.....	\$14.40 to \$14.90
Southern coke, No. 2 f'dry and 2 soft.....	13.90 to 14.40
Southern coke, No. 3 foundry.....	13.40 to 13.90
Southern No. 4 foundry.....	12.90 to 13.40
Southern gray forge.....	12.40 to 12.90
Ohio silvery, 8 per cent silicon.....	17.26 to 17.51
Southern Ohio coke, No. 1.....	16.26 to 16.51
Southern Ohio coke, No. 2.....	15.26 to 15.51
Southern Ohio coke, No. 3.....	15.01 to 15.26
Southern Ohio malleable Bessemer.....	15.26 to 15.51
Basic, Northern.....	15.26 to 15.51
Lake Superior charcoal.....	16.26 to 17.26
Standard Southern carwheel.....	26.90 to 27.40

(By Mail)

Finished Material.—Galvanized sheets continue to show weakness, due to a partial easing up in the spelter situation. We quote No. 28 galvanized sheets at 4c. to 4.50c., Pittsburgh basis. On the other hand, black sheets are firming up somewhat and are quoted around 1.90c. to 2c., Pittsburgh. Some business for nearby shipment is reported in both galvanized and black sheets. The local store quotations on No. 28 galvanized sheets remains at 4.50c., Cincinnati. Store prices on steel bars from stock range from 1.90c. to 2c., and structural shapes are firm at 2c. Steel bands are quoted at 1.30c., Pittsburgh, and steel hoops at 1.35c. There is a trifle more activity reported in both bands and hoops. Several inquiries have been issued lately for

steel shrapnel bars, one from Louisville, Ky., being for 15,000 tons and another from Dayton, Ohio, for approximately 12,000 tons. Tool steels continue to register sharp advances in prices, due to the tungsten shortage.

Coke.—Prompt Connellsville coke is a little weak, and some furnace grades are obtainable for immediate shipment as low as \$1.50 to \$1.60 per net ton at oven, the standard brands being held at higher figures. Last quarter furnace coke is quoted all the way from \$1.65 to \$1.90, and in some cases \$2 per ton is asked. Foundry coke ranges from \$2.15 to \$2.25 for prompt shipment and from \$2.25 to \$2.60 for contract business. Wise County and Pocahontas prices are a little higher than Connellsville quotations. Not much new business is being done, but shipments are going forward at a satisfactory rate, and this applies especially to the foundries in this vicinity.

Old Material.—Another general advance of 25c. per ton is reported on all grades of scrap material, and some heavy buying has been reported lately. Both rolling mills and foundries have been laying in large stocks, and are endeavoring to cover for their requirements, in some cases, for the first half of next year. The minimum figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices, f.o.b. at yards.

Per Gross Ton		
Bundled sheet scrap	\$8.00 to	\$8.50
Old iron rails	11.25 to	11.75
Relaying rails, 50 lb. and up.	20.00 to	20.50
Rerolling steel rails	9.75 to	10.25
Heavy melting steel scrap	9.75 to	10.25
Steel rails for melting	9.75 to	10.25
Per Net Ton		
No. 1 railroad wrought	\$9.25 to	\$9.75
Cast borings	5.75 to	6.25
Steel turnings	5.50 to	6.00
Railroad cast scrap	10.00 to	10.50
No. 1 machinery cast scrap	11.25 to	11.75
Burnt scrap	7.25 to	7.75
Old iron axes	14.25 to	14.75
Locomotive tires (smooth inside)	9.25 to	9.75
Pipes and flues	6.75 to	7.25
Malleable and steel scrap	8.00 to	8.50
Railroad tank and sheet scrap	6.00 to	6.50

Cleveland

CLEVELAND, OHIO, Aug. 10, 1915.

Iron Ore.—Statistics of receipts at lower lake docks published last week showed a much larger movement than was believed possible in view of the decreasing number of lake carriers actually in service. However, figures of ore on Lake Erie docks as of Aug. 1 showed also that the railroads have been forwarding to furnaces larger tonnages than imagined. The balance on dock on Aug. 1 was 6,629,653 tons, about 700,000 tons less than was on dock on May 1. Sales have been scattered and none for large tonnages, so that additional lake carriers are being tied up to dock this month. We quote prices as follows, delivered to lower lake ports: Old Range Bessemer, \$3.75; Mesaba Bessemer, \$3.45; Old Range non-Bessemer, \$3; Mesaba non-Bessemer, \$2.80.

Pig Iron.—Cleveland blast furnace interests to-day advanced their quotations on No. 2 foundry, malleable and foundry grades, to \$14, delivered Cleveland, for iron to be delivered over the last half of this year. This is the second advance of 50c. a ton announced by Cleveland furnaces in ten days. They also announce a quotation of \$14.25 to \$14.50 for these grades to be delivered in the first half of next year. Closely upon the heels of the recent advance of 50c. a ton in foundry, basic and malleable grades, has followed increased demand from buyers in the immediate Cleveland district. However, they have been brought face to face with a situation little expected only so short a time as a month ago—fairly well booked furnace capacity. No large tonnages are involved in this new lot of inquiry, but the aggregate is promising. Two 500-ton lots are asked by as many Cleveland foundries, an inquiry for 750 tons of foundry iron by a consumer situated outside the city limits and 1000 tons of malleable by a melter located within a short freight rate radius are several of the inquiries received. The United Steel

Company, Canton, Ohio, is inquiring for 12,000 to 15,000 tons of basic iron for delivery in the early part of next year. Renewed interest in the Bessemer market has been awakened by the sale of 1500 tons by a Valley furnace at \$14.75, furnace, for practically prompt delivery.

Coke.—Little business is being done in this district in Connellsville furnace coke, but foundry shipments continue fair, but with new inquiry scarce. Furnace coke is held at \$1.75 to \$1.85 for contracts with the usual slight shading of these prices for prompt material. Standard foundry coke is quoted at \$2.25 to \$2.60 per net ton at the ovens.

Finished Iron and Steel.—The demand for steel bars continues to be the feature. A steady run of good inquiry is coming not only to local mills but also to Cleveland agencies of outside mills. Practically little bar iron is being rolled on Cleveland mills, which have been turning to the manufacture of steel bars for several years. So strong is the local market for steel bars that an advance of \$1 a ton to 1.35c., Pittsburgh, prevailing in certain sections of the country is being discussed more seriously here. In fact, such an advance is expected here almost any day on bars and shapes. Plates have not been so firmly held, about 150 tons having been closed in this district by an outside mill at 1.25c., Pittsburgh basis, only a few days ago. Local lettings have not been noteworthy the past week. For 150 tons of reinforcing steel, 150 tons rails and 300 tons sheet steel piling for Cambridge, Ohio, water works, C. P. O'Reilly Company, St. Louis, was low bidder. In bar iron Cleveland mills are interested in the announcement a few days ago by an East Chicago mill that it has advanced its bar-iron price to 1.23½c., because this mill furnishes the only competition to Cleveland bar-iron mills. The northern Ohio steel sheet market is stiffening to the point that higher quotations are being put forward on new inquiry. Makers at Youngstown as well as nearer points Monday began quoting black No. 28 gage sheets at 1.90c. But others have not advanced higher than 1.85c., so the market here is regarded as ranging from 1.85c. to 1.90c. on this grade of material. Blue annealed, No. 10 gage, has advanced \$1 a ton to 1.50c.; but galvanized sheets have softened somewhat and No. 28 gage is quoted at 4.25c. to 4.50c., Pittsburgh. Some expectation is being entertained here of an advance in the price of black wrought steel pipe about the first of the month.

Semi-finished Steel.—Northern Ohio sheet mills are generally covered by contracts for their sheet bars so that the advanced quotations of the past few weeks have not affected them materially. However, this early some are beginning to feel out the fourth quarter quotations. No mill, so far as can be learned, has offered a fourth quarter figure either on billets or sheet bars. The Republic Iron & Steel Company, like the Carnegie Steel Company and the Jones & Laughlin Steel Company, has announced that it is out of the market for either Bessemer or open-hearth billets or sheet bars for third quarter delivery. Billets here are based on the Youngstown price of \$23 for open-hearth, and sheet bars on the Youngstown quotation of \$24 for open-hearth, with Bessemer material \$1 a ton lower. Wire rods have been advanced to Cleveland consumers to \$27, Pittsburgh. It is understood a small lot of wire rods has brought \$29, but this was for prompt delivery.

Nuts, Bolts and Rivets.—Such a demand is being made on Cleveland nut and bolt works the past two weeks that the first price advance has held and a second one now is in effect among the larger concerns. The previous advance on the larger sizes has been communicated to the smaller. The advance is more general than appeared a week ago. We quote rivets at 1.50c., Pittsburgh, for structural and 1.60c. for boiler rivets. Bolt and nut discounts are as follows: Common carriage bolts, ¾ x 6 in., smaller or shorter, rolled thread, 75, 10, 10 and 5; cut thread, 75, 10 and 10; larger or longer, 75 and 5; machine bolts with h.p. nuts, ¾ x 4 in., smaller or shorter, rolled thread, 75, 10, 10 and 10 per cent; cut thread, 75, 10, 10 and 5 per cent; larger and longer, 75 and 10; coach and lag screws, 80 and 15 per cent; square h.p. nuts, blank

tapped, \$6 off the list; hexagon h.p. nuts, blank or tapped, \$6.70 off; c.p.c. and t. square nuts, blank or tapped, \$5.50 off; hexagon, 5/8-in. and larger, \$7 off; 1/2 and smaller, \$7.50 off.

Old Material.—A large part of the iron and steel scrap trade has launched upon somewhat of a speculative market, and quotations are being pushed upward rather rapidly. Mills in this territory appear to have been quietly buying for several weeks, and most of them are fairly well supplied. Generally supplies are in plenty, but shipments have been so fast that some mills have been rejecting them. The United Steel Company's works at Canton, Ohio, have been embargoed. Heavy melting steel quotations have been advanced 50c. a ton. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton	
Old steel rails, rerolling	\$11.75 to \$12.75
Old iron rails (nominal)	13.00
Steel car axles	14.00
Heavy melting steel	11.50 to 11.75
Old car wheels	9.75 to 10.00
Delaying rails, 50 lb. and over	22.50
Agricultural malleable	9.50 to 10.00
Railroad malleable	10.75 to 11.25
Steel axle turnings	9.00 to 9.25
Light bundled sheet scrap (nominal)	9.00 to 9.25

Per Net Ton	
Iron car axles (nominal)	\$15.00 to \$15.50
Cast borings	6.25 to 6.75
Iron and steel turnings and drillings	5.75 to 6.00
No. 1 bushing (nominal)	8.75 to 9.00
No. 1 railroad wrought	10.25 to 10.50
No. 1 cast	10.00 to 10.50
Railroad grate bars	8.00 to 8.50
Stove plate	8.50 to 8.75

Birmingham

BIRMINGHAM, ALA., Aug. 9, 1915.

Pig Iron.—In a week the Birmingham iron market has jumped from \$10.50 to \$11 for spot and \$11.25 for last quarter. On Monday the Sloss-Sheffield Company advanced to this basis and later the Republic and Woodward were in line, all making spot sales at \$11. Speculators who endeavored to get into the market for 10,000 tons at \$10.50 were turned down. An offer of \$10.50 cash for 1000 tons made by a local consumer on Friday last was refused. Early in the week one maker sold several lots of No. 1 in 300 to 500 ton lots at \$11. This was about the last of the \$10.50 basis, 3000 tons being the volume of business at this figure. Perhaps the feature of the week was the announcement by the Tennessee Company, which recently withdrew from the market for this year and named \$12.50 for 1916 delivery, that several lots aggregating a round tonnage had been sold for 1916 at that figure. It is the only maker yet quoting for next year. What was at first thought to be a prohibitory price materialized in actual business of respectable proportions. Probably 15,000 tons for this year's delivery changed hands the latter part of the week on the \$11 basis. In several instances this price was declined to new customers on the plea of no iron to be had, regular customers being the principal takers. One company instructed its agents to sell only small lots at the new level of \$11 until further instructions. A firm offer of \$11 for 900 tons was received and booked last Saturday. At the end of the week \$11 was an all round minimum, nothing under that being obtainable anywhere. Last week the Tennessee Company lighted fires in a Bessemer furnace. The Republic Company is completing the relining of a third stack preparatory to what will doubtless be resumption. A second Bessemer stack will also likely go in and by Sept. 1 the make will be increased by at least two stacks, making twenty-two active. The upward trend is felt everywhere. The Alabama Company, maker of special high silicon Clifton brand iron, is selling at \$12.50 and \$13 on firm offers without soliciting. The nervousness of consumers is increasing as the growing scarcity of foundry iron is realized. There is little or no basic to be had in Alabama. The Gulf States and Tennessee companies report operations at capacity. The same is the case with other steel mills, which are taking care of the home basic output. Merchant foundries are reported as adding materially to their unfilled order list. Stove works are about to

resume after a long spell of comparative idleness. Stocks decreased in July at about the same rate as is June, namely 25,000 to 30,000 tons. We quote, per gross ton, f.o.b. Birmingham district furnaces, for spot and fourth quarter as follows:

No. 1 foundry and soft	\$11.50 to \$11.75
No. 2 foundry and soft	11.00 to 11.25
No. 3 foundry	10.50 to 10.75
No. 4 foundry	10.25 to 10.50
Gray forge	10.00 to 10.25
Basic	No quotation
Charcoal	22.50 to 23.00

Cast-Iron Pipe.—The gas and water pipe makers report operations at 85 per cent of capacity, with orders sufficient to assure this rate of activity for some time and general prospects as thoroughly satisfactory. The advance in pig iron has caused a revision in pipe prices, and an advance of 50c. per ton has been made. While the producing capacity will soon be increased by resumption at plants now being reconstructed, present conditions will not be affected thereby. We quote, per net ton, f.o.b. pipe shop yards, as follows: 4-in., \$21; 6-in. and upward, \$19, with \$1 added for gas pipe. The sanitary pipe shops are not active, it being their dull season, but there are also indications of better demand and greater activity with them.

Coal and Coke.—The renewal of furnace activity has further shortened the supply of available coke, thus adding to its firmness and raising prices. The Woodward Company has been forced to get some coke from the Tennessee by-product ovens at Ensley. Foundries are taking larger supplies. We quote, per net ton, f.o.b. oven, as follows: Beehive furnace, \$2.75 to \$3; beehive foundry, \$3.25 to \$3.50; by-product, \$2.25 to \$2.75. Coal has begun to show some strength at last, owing to the larger amount going into furnace coke and the smaller supply for the general market. The plan of the Alabama & New Orleans Transportation Company for carrying the Edgewater coal of the Tennessee Company down the Warrior River is to load the coal through a hole to be made in a railroad bridge over the river.

Old Material.—The scrap market has strengthened in consequence of an increasing demand, especially for heavy steel scrap, which has advanced 50c. per ton. Other grades bid fair to follow in the immediate future. Stocks are not accumulating. The prospect is very good. We quote, per gross ton, f.o.b. dealers' yards, as follows:

Old iron axles	\$13.00 to \$13.50
Old steel axles	12.50 to 13.00
Old iron rails	12.50 to 13.00
No. 1 railroad wrought	8.00 to 8.50
No. 2 railroad wrought	7.50 to 8.00
No. 1 country wrought	8.00 to 8.50
No. 1 machinery cast	8.25 to 8.75
No. 1 steel scrap	8.50 to 9.00
Tram car wheels	8.25 to 8.75
Stove plate	7.25 to 7.75

St. Louis

ST. LOUIS, Mo., Aug. 9, 1915.

Pig Iron.—Sales have become more numerous and larger and the improvement is regarded as not coming from war orders. One large consumer took 15,000 tons of basic part Northern and part Southern, while another on the East Side is in the market for 15,000 tons, delivery in both cases to extend into 1916. Other sales include 2000 tons of malleable of special analysis, one of 1500 tons of No. 2 Southern foundry iron and a considerable number of sales of 500 tons and below. Ohio high silicon is also very hard to get except at high prices.

Coke.—By-product coke quotations continue to remain on a level which puts all but local product out of the market, although nominally the figures are on a parity with Connellsville oven prices.

Finished Iron and Steel.—Deliveries continue more extended and fabricators and others are becoming more inclined to make contracts ahead. Plates, however, remain dull. Track fastenings are quite active. Out of warehouse the movement is large with buyers paying the retail prices readily. We quote for stock out of

warehouse as follows: Soft steel bars, 1.70c.; iron bars, 1.65c.; structural material, 1.80c.; tank plates, 1.80c.; No. 10 blue annealed sheets, 2c.; No. 28 black sheets, cold rolled, one pass, 2.55c.; No. 28 galvanized sheets, black sheet gage, 4.85c.

Old Material.—Prices are moving upward, particularly on steel. Relaying rails are active in demand and hard to get. Lists out include 500 tons from the Kansas City Southern, 200 tons from the Minneapolis & St. Louis, 600 tons from the Mobile & Ohio, 700 tons from the Vandalia, 1700 tons from the Big Four, 1000 tons from the Chicago, Milwaukee, St. Paul & Omaha and 3000 tons from the Southern. We quote dealers' prices f.o.b. St. Louis as follows:

Per Gross Ton	
Old iron rails	\$11.00 to \$11.50
Old steel rails, re-rolling	11.25 to 11.75
Old steel rails, less than 3 ft.	11.25 to 11.75
Relaying rails, standard section, subject to inspection	22.00 to 23.00
Old carwheels	10.25 to 10.75
No. 1 railroad heavy melting steel scrap	11.00 to 11.25
Shoveling steel	9.50 to 10.00
Frogs, switches and guards cut apart	11.00 to 11.25
Bundled sheet scrap	6.50 to 6.75
Per Net Ton	
Iron angle bars	\$11.00 to \$11.25
Steel angle bars	9.75 to 10.00
Iron car axles	15.50 to 15.75
Steel car axles	12.00 to 12.50
Wrought arch bars and transoms	12.50 to 13.25
No. 1 railroad wrought	9.50 to 10.00
No. 2 railroad wrought	9.00 to 9.25
Railroad springs	9.75 to 10.00
Steel couplers and knuckles	9.75 to 10.00
Locomotive tires, 42 in. and over, smooth inside	10.25 to 10.50
No. 1 dealers' forge	8.50 to 8.75
Mixed borings	6.00 to 6.25
No. 1 busheling	8.25 to 8.50
No. 1 boilers, cut to sheets and rings	6.50 to 7.00
No. 1 railroad cast scrap	9.50 to 10.00
Stove plate and light cast scrap	7.75 to 8.25
Railroad malleable	8.50 to 8.75
Agricultural malleable	7.50 to 7.75
Pipes and flues	7.00 to 7.50
Railroad sheet and tank scrap	7.00 to 7.25
Railroad grate bars	7.50 to 7.75
Machine shop turnings	6.50 to 6.75

Buffalo

BUFFALO, N. Y., Aug. 10, 1915.

Pig Iron.—The top prices of last week's quotations have now become the minimum this week. Furnaces are holding firmly for \$13.50 minimum for prompt shipment on No. 2 X and \$14 for forward shipment. Several lots of No. 2 X of 400 and 500 tons each have been placed at \$14 for fairly prompt delivery. Between 15,000 and 20,000 tons of the various grades have been placed in the past week, but furnaces are not now aggressively seeking business even at the advancing prices. Shipments on contracts are going forward in heavy volume, many users calling for twice to three times the quantities taken out a month or two ago. We quote as follows f.o.b. furnace Buffalo for current and fourth quarter delivery:

No. 1 foundry	\$13.75 to \$14.25
No. 2 X foundry	13.50 to 14.00
No. 2 plain	13.50 to 13.75
No. 3 foundry	13.50 to 13.75
Gray forge	13.50 to 13.75
Malleable	13.50 to 14.00
Basic	14.00 to 14.25
Charcoal, regular brands and analysis	15.75 to 17.25
Charcoal, special brands and analysis	19.00 to 20.00

Finished Iron and Steel.—The market for bar material is very strong at 1.30c., Pittsburgh, for remainder of year, with prospects of an advance to 1.35c. for last quarter. Mill deliveries are being extended to 60 to 90 days. A number of mills are showing a disposition not to quote for last quarter, and 1916 business is apparently not being considered by either buyer or seller. One producer of wire and wire products announces that it is sold up for the remainder of the year. Prices are rigid at \$1.40 on wire and \$1.60 on nails, and no deliveries are obtainable under 90 days. In plates and shapes prices are equally strong, and deliveries are from four to five weeks behind. Warehouse business is improving. Business continues active in fabricated structural lines. The Lackawanna Bridge Company has contract for 300 tons for the Buffalo Bolt Company at North Tonawanda, N. Y., and the Fergu-

son Steel & Iron Company, Buffalo, about 100 tons for the Simplex Automobile Company at New Brunswick, N. J., for which the John W. Cowper Company, Buffalo, has the general contract. Bids are soon to be received for a high school building at Erie, Pa.

Old Material.—A large volume of business has been transacted. Several heavy sales of melting steel have been made principally for shipment to Pittsburgh district mills, the first time in a long period that the price obtainable at Pittsburgh would allow for the freight differential from this district. The advance in price amounted to 50c. per ton, f.o.b. Buffalo. The local demand for this commodity was also good. Steel axles were also particularly active and several large sales made at increased prices for shipment to outside points. A sharp advance also occurred in wrought pipe. Demand for cast scrap, old carwheels and railroad malleable alone was light. We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	\$11.50 to \$12.00
Low phosphorus steel	14.50 to 15.00
No. 1 railroad wrought scrap	11.00 to 11.50
No. 1 railroad and machinery cast	11.00 to 11.50
Old steel axles	14.25 to 14.75
Old iron axles	16.50 to 17.00
Old carwheels	11.50 to 12.00
Railroad malleable	10.50 to 11.00
Machine shop turnings	5.75 to 6.25
Heavy axle turnings	8.50 to 9.00
Clean cast borings	7.00 to 7.25
Old iron rails	11.50 to 12.00
Locomotive grate bars	9.00 to 9.50
Stove plate (net ton)	8.25 to 8.75
Wrought pipe	8.50 to 8.75
Bundled steel scrap	7.75 to 8.25
No. 1 busheling scrap	8.50 to 9.00
No. 2 busheling scrap	7.50 to 8.00
Bundled tin scrap	9.00 to 9.50

New York

NEW YORK, Aug. 11, 1915.

Pig Iron.—Sales of foundry iron through offices in New York City the past week have probably amounted to 30,000 tons, including one lot of 5000 tons to a soil pipe interest. On this last transaction deliveries are in the first half of next year, but for the most part sales have been for 1915 delivery, with portions carrying over into the first quarter of 1916. Prices have advanced and on 1916 deliveries most furnace companies are asking \$1 above what has recently prevailed. With most of them the disposition is to hold off on 1916 business. Here and there, and this is mostly in the case of smaller foundries, the buyer shows some eagerness to cover. Thus far, however, there is no feverishness in the market. Naturally, in view of the recent advances in all markets, sellers are growing more confident of their position and there are some signs of the return of a sellers' market after a long absence of such a situation. One inquiry that has just come up is for 5000 tons for this year's delivery in large part, from a railroad equipment company in New York State. Several sales of 1000 tons to 1500 tons have been made in the past week and quite a number of 500 to 600 tons. Eastern Pennsylvania furnaces are asking \$14.50 to \$14.75 at furnace for No. 2 X foundry for fourth quarter delivery. One Virginia producer has advanced its price on No. 2 X to \$13.50 at furnace, but for this year's delivery is selling No. 2 plain at \$12.50 and No. 3 at \$12.25. For the first half of 1916, it quotes \$13.50, \$13 and \$12.75 respectively. Buffalo furnaces ask \$14 at Buffalo for 1916 iron. For this year's delivery they are quoting \$13 for lower silicons and \$13.50 for higher silicons. We quote at tidewater as follows: No. 1 foundry, \$15.50 to \$15.75; No. 2 X, \$15 to \$15.25; No. 2 plain, \$14.75 to \$15; Southern iron, \$15.75 to \$16 for No. 1 and \$15.25 to \$15.50 for No. 2.

Structural Material.—The hopes for a substantial revival in buying, based in part on the strength of plain material, are not yet realized, but in view of the comparative scarcity of steel and the well booked condition of structural mills, the present local quietness is occasioning no concern. Perhaps the most interesting feature is the report that the Bethlehem Steel Company, as already mentioned in this column, has

taken some large structural contracts for erection. There are positive assertions that this company has agreed to build the steel structure for the August Heckscher loft building on Madison Avenue, taking 3000 tons, and some 7500 tons for the Larkin printing lofts, a total for three projects approaching 15,000 tons. How special these cases are or to what extent there will be sub-contracting for erecting or even fabricating, cannot be learned, and it is possible the details are not settled. The American Bridge Company has closed for over 17,000 tons for subway work, including 11,650 tons for the Eastern Parkway subway system and 5700 tons for the Nostrand Avenue line in Brooklyn. The Phoenix Bridge Company is to build the 4000 tons for the Myrtle Avenue line for the New York Municipal Railways. The McClintic-Marshall Company has taken an additional round tonnage for the extensions of the Baldwin Eddystone plant, Philadelphia, and the Jones & Laughlin Steel Company has closed for 7300 tons for a warehouse in Pittsburgh. Other awards of size include 3000 tons for the Fisk Rubber Company, Chicopee, Mass., to the Berlin Construction Company; 1800 tons for the Fullerton-Weaver apartment, East Forty-seventh Street, to the Hinkle Iron Company; 300 tons for the Cadillac Garage, Long Island City, to the Vanderstucken-Ewing Construction Company, Bethlehem, Pa., and it is learned that the Cuban railroad bridge work taken by Milliken Brothers, will require at least 3000 tons against 2000 tons as reported last week. The largest new project learned of is pier No. 9, North River, for the Central Railroad of New Jersey, taking 900 tons. We quote mill shipments at 1.30c., Pittsburgh, or 1.469c., New York. For small lots from store we quote 1.95c. to 2c., New York.

Steel Plates.—At least one more mill has brought its minimum to 1.30c. Pittsburgh. Large tonnage inquiries are commonly referred to the mills, with the reservation that 1.25c. quotations are less likely than recently and dependent altogether on the attractiveness of the proposal. Deliveries are rarely promised inside of four weeks. Export prices have further stiffened and they appear to be easily on a parity with the domestic business, or 1.30c., Pittsburgh. Railroad consumption for cars has not yet picked up and about the only contract of size is 1000 car bodies for the Baltimore & Ohio, of which 300 goes to the Pressed Steel Car Company and 300 to the American Car & Foundry Company. The Maine Central is asking prices on 1100 center constructions, with a delivery, however, of no more than 60 per month. We quote 1.25c. to 1.30c., Pittsburgh, or 1.419c. to 1.469c., New York, for mill shipments. Plates from store are 1.95c. to 2c., New York.

Iron and Steel Bars.—Deliveries are perhaps a little more extended than a week ago, with Bessemer bars, which are more generally being supplied in general merchant bar orders, in ten weeks and open-hearth steel in twelve and more weeks. Foreign inquiry is still of large proportions, but difficult to estimate, partly from the duplication of inquiry and partly from the lack of interest of some companies, owing to their well filled order books for the next few months. The demand is for bars of various sizes from 75 mm. upward and there is a domestic inquiry for 30,000 tons of $\frac{1}{2}$ -in. square soft steel bars, to be delivered 5000 a month. The competition of iron bars with steel bars is further proved this week, in sales of the iron product where steel has formerly been used, and in the fact that following the decision of the American Iron & Steel Manufacturing Company to base its bar iron on Pittsburgh, that company has also established the same quantity differentials as obtains with steel bars; namely, that an extra 0.15c. per lb. is charged for quantities less than 2000 lb., but not less than 1000 lb. and of 0.35c. per lb. for quantities less than 1000 lb. We quote mill shipments of steel bars at 1.30c., Pittsburgh, or 1.469c., New York, and refined bars 1.35c. to 1.419c., New York. Out of store in New York iron and steel bars are 1.90c. to 1.95c.

Cast-Iron Pipe.—An error was made last week in stating the quantity on which Perth Amboy, N. J., was asking bids, to be opened Aug. 4. The quantity was

400 tons, on which the Standard Cast Iron Pipe & Foundry Company was low bidder. No new public lettings of noteworthy size are announced in this vicinity. Private buying continues at a satisfactory rate, and some of the orders thus being placed are of good size. Prices show an advancing tendency, partly due to the higher prices asked for pig iron and partly to the steadily improved status of the pipe foundries. Car-load lots of 6-in., class B and heavier, are quoted at \$23 to \$23.50 per net ton, tidewater, class A and gas pipe taking an extra of \$1 a ton.

Old Material.—Prices have advanced all along the line and a higher level is confidently expected because of the improvement in general conditions. The volume of business the past week has been large, all classes of consumers being in the market. On Tuesday of this week the upward movement was halted through overbuying by some dealers who found themselves with loaded cars which had to be moved quickly, but this is believed to be merely a temporary matter, without market significance. Brokers are paying about as follows to local dealers and producers, per gross ton, New York:

Old girder and T rails for melting	\$11.00 to \$11.50
Heavy melting steel scrap	11.00 to 11.50
Relaying rails	19.50 to 20.00
Rerolling rails	11.00 to 11.50
Iron car axles	16.50 to 17.00
Steel car axles	14.25 to 14.75
No. 1 railroad wrought	12.00 to 12.50
Wrought iron track scrap	11.50 to 12.00
No. 1 yard wrought, long	11.25 to 11.50
No. 1 yard wrought, short	11.00 to 11.50
Light iron	4.00 to 4.25
Cast borings	7.25 to 7.50
Wrought turnings	7.25 to 7.50
Wrought pipe	10.00 to 10.25

Foundries are not buying as actively as other classes of consumers, but are doing considerably better than a short time ago. Dealers' quotations to consumers of cast scrap are as follows, per gross ton, New York:

Old carwheels	\$10.75 to \$11.25
No. 1 cast (machinery)	12.25 to 12.50
No. 2 cast (heavy)	11.00 to 11.25
Stove plate	9.25 to 9.50
Locomotive grate bars	8.25 to 8.50
Malleable cast	8.75 to 9.00

British Market Quiet

Higher Prices Expected on Semi-Finished Steel
—American Makers Not Taking Current Prices

(By Cable.)

LONDON, ENGLAND, Aug. 11, 1915.

Pig iron is firm but very quiet, and all markets are featureless. A little better inquiry is coming out for semi-finished steel, but American makers are very unwilling to sell at current rates, much better prices being expected. The demand for finished steel is moderate and prices are firm. Attention is mainly concentrated on munitions. Tin plates are easy, with very little doing. Stocks of pig iron in Connal's stores are 142,217 gross tons, against 145,067 tons a week previous. We quote as follows:

Tin plates, coke, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 18s. 6d. (\$4.50), against 19s. (\$4.62) last week.
Cleveland pig-iron warrants, 66s. 2d. (\$16.10), against 66s. (\$16.06) last week.
No. 3 Cleveland pig iron, maker's price, f.o.b. Middlesbrough, 66s. 3d. (\$16.12), unchanged.
Steel black sheets, No. 28, export, f.o.b. Liverpool, £11 15s. (\$57.18).
Steel ship plates, Scotch, delivered local yards, £9 15s. (\$47.44).
Steel rails, export, f.o.b. works port, £8 17s. 6d. (\$43.19).
Hematite pig iron, f.o.b. Tees, 97s. (\$23.60), against 100s. (\$24.33), last week.
Sheet bars (Welsh), delivered at works in Swansea Valley, £7 10s. (\$36.49).
Steel joists, 15 in., export, f.o.b. Hull or Grimsby, £10 (\$48.66).
Steel bars, export, f.o.b. Clyde, £10 15s. (\$52.31).
Ferromanganese, f.o.b., £20 15s. (\$100.98).
Ferrosilicon, 50 per cent, c.i.f., £15 5s. (\$74.21.)

Details of the Latest Restrictions on Ferromanganese Exports

LONDON, July 29, 1915.

(By Mail.)

The pig-iron market has been quiet and uninteresting, but the prevailing opinion is that the position will gradually strengthen further, and this encourages producers to hold out for stiff figures. The position of hematite has certainly improved, largely due to the release of quantities for Italy which had been held up for so long. Already one or two full cargoes have been fixed up, while there are now considerable sales reported for France. Foreign ore is at a standstill, and a serious shipping strike has broken out in Bilbao which may have important consequences. Coke is easier, but is still held for outlandish figures, thanks to the manipulation of the colliery and coke interests who must be making a very fine thing out of war conditions.

The ownership of the Carnforth Hematite Iron Company is about to be acquired by a financial corporation in London. The property is one of the most important producers of hematite on the West Coast. An amount equivalent to £21 10s. per £10 share of the company is payable as to £11 10s. in cash, £3 in 4½ per cent war loan, £3 10s. in 6 per cent non-cumulative preference shares, and £3 10s. in ordinary shares of the new company, which the purchasers will form with a capital of £144,000, equally divided between 6 per cent non-cumulative preference shares and ordinary shares, with a 5½ per cent debenture issue of £144,000.

The new development in the ferromanganese situation in this country has already been cabled briefly to THE IRON AGE. It is understood that the director of the Ministry of Munitions has ordered all makers to keep in stock in their yards the equivalent of three months' production from the furnaces and to hold in reserve a full three months' supply of ore; also that consumers are to keep a stock of three months' requirements of ferromanganese, this quantity to be over and above that required for current consumption. These precautions are to last throughout the war. The director of munitions has also called for monthly returns as regards consumption, stocks, etc., of ferromanganese and manganese ore. Consumers have already specified for their three months' stock requirements, but it is not known whether the order to consumers applies to all steelmakers throughout the country or only to steelmakers who are engaged upon government work. A leading producer has issued a circular to customers stating that owing to the scarcity of manganese ore it cannot deliver material for export. Meantime, there is no change and prices remain at £20 (\$97.33) f.o.b. loose and £20 15s. (\$100.98) f.o.b. packed.

There is very little doing in half-finished steel, and Welsh works are feeling very acutely the semi-paralysis in the galvanized sheet and tin-plate trades. Business in each of these branches, but more particularly in the latter, is cut down to a minimum, and the outlook is anything but bright. Very little American steel is offered here now. The Lackawanna Steel Company has withdrawn from the market, while other sellers are not cutting much of a figure. Some business was done a few days ago in 4, 5 and 6-in. blooms at £7 (\$34.07) a ton c.i.f. at Liverpool, and 2-in. billets have sold at £7 5s. (\$35.27) c.i.f. Liverpool.

The finished steel situation remains absolutely unchanged, and most works are refusing fresh merchant business because they are devoting themselves primarily to the service of the State. At Sheffield the output of steel has now reached the highest point on record, while valuable orders are being refused every day because of the lack of adequate resources.

The Kellogg Structural Steel Company, Buffalo, N. Y., has purchased 2½ acres at Bailey Avenue and Broadway, with 750 ft. of frontage on the New York Central Railroad, and will at once build a new fabricating shop, 55 x 185 ft., of structural steel, and later an additional shop of the same size.

Metal Market

NEW YORK, Aug. 11, 1915.

The Week's Prices

Cents Per Pound for Early Delivery

Copper, New York		Tin, New York		Lead, New York		Spelter, New York	
Aug.	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
4.....	20.75	18.25	35.25	5.00	4.90	16.75	16.50
5.....	20.50	18.12½	35.00	5.00	4.90	16.50	16.25
6.....	20.00	18.00	34.62½	5.00	4.90	16.00	15.75
7.....	20.00	18.00	34.50	5.00	4.90	15.50	15.25
9.....	20.00	17.87½	34.25	4.75	4.65	14.25	14.00
10.....	20.00	17.75	34.62½	4.50	4.40	14.25	14.00

Copper is inactive and lower. Tin is lower, though there has been good buying this week. Lead is dull and has been sharply reduced by the leading interest. Spelter has continued to decline in a stagnant market. Antimony is easier.

New York

Copper.—In the latter part of last week, when electrolytic came down to 18c., several thousand tons were sold and for the time established the market at that level. There was talk of a great deal more business, but it did not come to fruition, and the market again became as dull as it had been in previous weeks. The sales made were both on domestic and export account, and for a time it looked as if a large buying movement was to set in. Though prime Lake did not share much in the activity, enough was sold to 20c. to fix the market at that figure. Some grades of Lake are quoted lower. A small quantity of resale Lake was reported to have gone at less than 20c. Since then the market has declined further, and yesterday 17.75c., cash, New York, was quoted for electrolytic, with Lake unchanged at 20c. The ordinary domestic consumption is estimated at about 60 per cent. While the war consumption continues heavy, enough metal was bought in the big movement of several weeks ago to cover present needs. Exports are very light, totaling only 3805 tons this month.

Tin.—Prices have continued to fall, and as the downward trend continued consumers began to show more and more interest until yesterday probably 500 to 600 tons of far futures changed hands, most of the business coming in the late afternoon and with a rush. Moderate interest was manifested last Thursday, and some business was done Friday and Saturday—not a great deal, but a fair amount considering the previous dullness. Yesterday, when the price touched 34.62½c., buyers took hold in earnest. Mixed with the future deliveries was some spot and early delivery metal. The arrivals this month total 1650 tons, and there is afloat 6175 tons.

Lead.—The leading interest on Aug. 7 reduced its New York price from 5.25c. to 5c.; on August 9, to 4.75c., and yesterday to 4.50c. Since July 30 five reductions have been announced, officially, and after each of them independent sellers have dropped their prices, though there is now less tendency to do so, with lead at 4.50c., New York. In the time referred to the metal has declined \$25 per ton. Conditions are much the same otherwise as they have been for several weeks, consumers not only showing but little disposition to buy, but in many cases being willing to sell themselves. Meanwhile deliveries are heavy. The New York and London prices are drawing nearer together, but they are not yet on a parity, and exports are not encouraged. It is evident that exports are needed to absorb production, and no real activity is looked for until they are possible. The exports this month total but 425 tons. The St. Louis price is 4.40c.

Spelter.—The situation is described as flat, dull and stagnant, and it has been so for some time. Quotations have declined steadily, with a particularly accentuated drop at the beginning of this week. The London market is dull and lower also, having declined over £25 since the beginning of the month. Yet, despite the lower quotations, prime Western spelter is said to be difficult to secure, some producers having none to sell. Brass mill special is nominally lower, but much higher proportionately than ordinary grades, quotations still being around 20c. Exports this month total 1641 tons.

The New York quotation yesterday was 14.25c. and for prompt shipment from the West 14c., St. Louis.

Antimony.—Like the other metals, antimony lacks new business, and prices are easier at 33.50c., duty paid, for Chinese and Japanese.

Old Metals.—Not enough business is being done to establish prices. Dealers' selling quotations, which are purely nominal, are as follows:

	Cents per lb.
Copper, heavy and crucible.....	\$16.50 to \$17.00
Copper, heavy and wire.....	16.00 to 16.50
Copper, light and bottoms.....	14.50 to 15.00
Brass, heavy.....	12.00 to 12.50
Brass, light.....	9.00 to 9.50
Heavy machine composition.....	13.00 to 13.50
No. 1 yellow rod brass turnings.....	13.00 to 13.50
No. 1 red brass or composition turnings.....	11.50 to 12.00
Lead, heavy.....	4.50
Lead, light.....	4.25
Zinc, 80/20.....	12.00

Chicago

AUG. 9.—A steady decline in metal prices is under way despite a fairly sustained buying. Scrap metals in particular have sharply depreciated in value. We quote: Casting copper, 17.75c.; Lake copper, 18c.; tin, carloads, 34.50c.; small lots, 35.50c. to 36.50c.; lead, 5c.; spelter, nominally, 16c.; sheet zinc, nominally, 24c.; Cookson's antimony, 47.50c. to 50c.; other grades, 37c. to 38c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 13.50c.; copper bottoms, 12.50c.; copper clips, 13.25c.; red brass, 11c.; yellow brass, 10c.; lead pipe, 4c.; zinc, 7½c.; pewter, No. 1, 18c.; tinfoil, 25c.; block tin pipe, 27c.

St. Louis

AUG. 9.—Nonferrous metals have been somewhat easier. Quotations to-day are: Lead, 5c.; spelter, 16½c.; tin, 38c.; Lake copper, 18½c.; electrolytic copper, 18c.; Cookson's antimony, 40c. In the Joplin ore market there was a recession in zinc blende, which sold at prices ranging from \$75 to \$100 per ton for 60 per cent metal, with the top settlement for premium ores at \$103. Calamine was stronger at \$50 to \$60 for 40 per cent, with the choicest bringing up to \$65. Lead ore was dull at \$50 for 80 per cent, a decline of \$10 per ton. Miscellaneous scrap metals are quoted as follows: Light brass, 7.50c.; heavy yellow brass, 9.50c.; heavy red brass and light copper, 11c.; heavy copper and copper wire, 13c.; pewter, 24c.; tinfoil, 30c.; zinc, 10c.; lead, 4c.; tea lead, 3.50c.

As the result of partly successful experiments at San Luis Potosi, Mexico, in smelting iron ore from the Barreno mine, ten miles from that city, a furnace is being installed capable of making four tons of pig iron daily, as reported by Consul W. L. Bonney of that city. The vein of iron ore is about 5 ft. wide at a depth of 200 ft. and the ore contains 55 to 62 per cent iron, with considerable arsenic.

A new dry dock and shipbuilding plant is being built on Oakland's inner harbor, Oakland, Cal., by the Hanlon Dry Dock & Shipbuilding Company. It is expected that the dock will have a capacity of 3500 tons and the yard will have full equipment for every kind of shipbuilding and ship repair work. It will make the third shipbuilding plant to locate on Oakland's inner harbor.

The Henry Vogt Machine Company, Louisville, Ky., has delivered to the Mengel Box Company, Hickman, Ky., manufacturer of veneering, several large presses, the castings for which were among the largest ever made by the Vogt Company.

Magnesite ore, crude and calcined, has been added to the embargo list of Greece, according to information received from the American consul at Athens, dated July 10, 1915.

The Pennsylvania Flexible Metallic Tubing Company, Philadelphia, Pa., exhibiting at the Panama-Pacific Exposition, announces that it has been awarded a gold medal.

Iron and Industrial Stocks

NEW YORK, Aug. 11, 1915.

War order stocks have continued to hold the favor of the speculative public, notwithstanding warnings by conservative financiers. Bethlehem Steel common attained a dizzy altitude by selling up to 311, which is an unparalleled performance for a non-dividend issue. In the past four weeks it has risen from 164 to 311. Industrial stocks generally have sympathized with the strength in the war order stocks and many of them have made new high records for this movement. Railroad stocks are beginning to receive more attention because of the brilliant crop conditions and the improvement in general business. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week has been as follows:

Allis-Chal., com..	32¼-38½	Pressed Stl., com. 52	- 65½
Allis-Chal., pref..	68½-72½	Pressed Stl., pref..	101
Am. Can., com...	57¾-60½	Ry. Spring, com.	38½-42¾
Am. Can., pref...	105½-106¾	Ry. Spring, pref.	91-94
Am. Car & Fdy.,		Republic, com...	42¾-46¼
com.....	59¾-63¾	Republic, pref...	97¾-98¾
Am. Car & Fdy.,		Rumely Co., com.	4½-6
pref.....	115¾-118	Rumely Co., pref.	10½-13
Am. Loco., com...	52¾-56½	Sloss, com.....	44-47¼
Am. Loco., pref..	96¼-98	Sloss, pref.....	86¾-90
Am. Stl. Fdries...	42-44¼	Pipe, com.....	16-20¾
Bald. Loco., com.	78¼-83¾	Pipe, pref.....	39-45
Bald. Loco., pref.	103-106	U. S. Steel, com...	68¾-76¾
Beth. Steel, com.	278¾-311	U. S. Steel, pref.	111¾-113¼
Beth. Steel, pref.	132½-141¾	Va. I. C. & Coke.	49½-51
Colorado Fuel...	40-42¾	West'gh'se Elec.	110½-115
Deere & Co., pref.	94-95½	Am. Ship, com...	40-48¾
General Electric.	171¼-174½	Am. Ship, pref...	78-79½
Gt. No. Ore Cert.	41-43¾	Chic. Pneu. Tool.	73-87
Int. Harv. of N. J.,		Cambria Steel...	51¾-55¼
com.....	104½-111¾	Lake Sup. Corp...	9½-10¾
Int. Harv. Corp.,		Pa. Steel, com...	34
com.....	64-70	Pa. Steel, pref...	84¾-85¼
Lackawanna Stl.	51-56½	Warwick.....	9¼-11
Nat. En. & St.,		Cruc. Steel, com...	73¼-85
com.....	23-24¾	Cruc. Steel, pref.	102-105½
Nat. En. & St.,		Harb.-Walk. Ref.,	
pref.....	87½	pref.....	98
Pittsburgh Steel,		La Belle Iron,	
pref.....	91-92	com.....	35½-37

Dividends

The American Radiator Company, regular quarterly, 1¼ per cent on the preferred stock, payable Aug. 16, and 4 per cent on the common stock, payable Sept. 30.

The American Smelting & Refining Company, regular quarterly, 1¼ per cent on the preferred stock, payable Sept. 1, and 1 per cent on the common stock, payable Sept. 15.

The International Nickel Company, regular quarterly, 5 per cent on the common stock, payable Sept. 1.

The Niles-Bement-Pond Company, regular quarterly, 1½ per cent on the preferred stock, payable Aug. 16.

The Pratt & Whitney Company, regular quarterly, 1½ per cent on the preferred stock, payable Aug. 16.

The Studebaker Corporation, regular quarterly, 1¼ per cent on the preferred stock and 1¼ per cent on the common stock, both payable Sept. 1.

A recent application of Prest-O-Lite gas in combination with oxygen for cutting steel work was at the drawbridge of the Florida East Coast Railway, over the St. Johns River at Jacksonville, Fla. In the construction of this bridge sheet steel piling having a ¾-in. web and approximately 2¼ in. thick on the lock joint was driven to form the protection piers. Approximately 860 ft. of this piling had to be cut off at a uniform height and at the lock joint practically four sections of metal had to be cut through. This necessitated frequent changes in the adjustment of the blowpipe. One man did the cutting and between 40 and 50 ft. of piling was cut in 7 hr.

The United States Bureau of Labor Statistics has just issued its annual review of court decisions affecting labor as its Bulletin No. 169. Approximately 265 decisions are summarized, dealing with the application and construction of the laws, or with the application of the principles of the common law to the rights and relations of the worker.

A POWER PIPING SOCIETY

It Has Produced a Standard Power Plant Piping Specification

Designers and erectors of power piping have formed an organization known as the Power Piping Society, with headquarters at Pittsburgh. The aims are to improve manufacturing methods and to standardize practices as far as possible. Following the work of the American Society of Mechanical Engineers, in conjunction with a committee of manufacturers, on standardization of fittings and valves, it has drawn up standard specifications for power piping. These conform to the standards of the fittings and valves referred to, as to dimensions, and generally to those of the American Society for Testing Materials, as to physical requirements of the materials and have the following stipulations covering the sizes and constitution of piping for different uses:

PIPE

Wrought pipe shall be steel. Standard pipe shall be butt welded for sizes 3 in. and smaller and lap welded for sizes 3½ in. and larger. Extra strong pipe shall be butt welded for sizes 2 in. and smaller and lap welded for sizes 2½ in. and larger.

Steam between 150 and 250 lb. per square inch inclusive: Pipe shall be full weight 7 in. and smaller. Sizes larger than 7 in. shall be of the following thicknesses or weights per foot: 8 in., 28.55 lb.; 9 in., 33.90 lb.; 10 in., 40.48 lb.; 12 in., 49.56 lb.; 14 to 20 in. inc., ¾ in.; 22 to 24 in. inc., 7/16 in.

Steam between 125 and 149 lb. per square inch inclusive; suction and low pressure water: Pipe shall be full weight 7 in. and smaller. Sizes larger than 7 in. shall be of the following thicknesses or weights per foot: 8 in., 24.69 lb.; 9 in., 33.90 lb.; 10 in., 34.24 lb.; 12 in., 43.77 lb.; 14 to 20 in. inc., 5/16 in.; 22 to 24 in. inc., ¾ in.

Boiler-feed: Pipe for pressures between 150 and 250 lb. per square inch inclusive shall be extra strong and between 125 and 149 lb. per square inch inclusive, shall conform to the specification for "Steam" for the same pressures.

Exhaust piping: Pipe 7 in. and smaller shall be full weight; 8 to 12 in. inc., shall be the same as for steam between 125 and 149 lb. inc.; between 14 and 18 in. inc., it shall be ¼ in.; and between 20 and 24 in. inc., it shall be of the lightest card weight.

Blow-off: Pipe shall be extra strong.

Drains: Pipe shall conform to the specification for steam piping for the same pressure and service.

Welding: Where it is advisable economically, branches shall be welded to main piping, in preference to the use of fittings. All welds so made shall receive a hammer test under hydrostatic pressure three times the working pressure. The fillets shall be built up to a radius equal to not less than three times the thickness of the pipe wall.

Bends: Bends shall be used for changes of alignment in preference to fittings. They shall be substantially round in section and free from injurious buckles. Radii equal to 6 diameters of the pipe shall be used where possible.

Where used for exhaust, suction, and low-pressure water, cast-iron pipe shall correspond in thickness to Class A pipe as specified by the American Water Works Association.

Stipulations are made at length regarding stop valves, the kind of flange joints for different cases, gaskets, etc., and the following extracts will serve to indicate their character.

STOP VALVES

Superheated steam: Gate valves 2 in. and larger shall be extra heavy, outside screw and yoke pattern, with cast-steel bodies, bonnets, discs and yokes; Monel metal or 23 per cent nickel steel seats and disc rings; Monel metal or 23 per cent nickel steel stems; and Monel metal or 23 per cent nickel steel back-seating bushing below the stuffing box. Valves 8 in. and larger shall be by-passed. Globe and angle valves 2 in. and larger shall conform to the same general specification. All stop valves 1½ in. and smaller shall be extra heavy and shall be made of bronze containing not less than 10 per cent of nickel. Valves shall be tested to 800 lb. hydrostatic pressure.

Saturated steam between 150 and 250 lb. per square inch inclusive: Gate valves 2½ in. and larger shall be extra heavy, outside screw and yoke pattern, with semi-steel bodies, bonnets, discs and yokes; bronze seats and disc rings and bronze stems. Gate valves 8 in. and larger shall be by-passed. Globe and angle valves 2½ in. and larger shall con-

form to the same general specification. All stop valves 2 in. and smaller shall be extra heavy bronze. Valves shall be tested to 800 lb. hydrostatic pressure.

Saturated steam between 125 lb. and 149 lb. per square inch inclusive: Gate valves 2½ in. and larger shall be medium, outside screw and yoke pattern, tested to 500 lb. hydrostatic pressure, with gray iron bodies, bonnets, discs and yokes; bronze seats and disc rings, and bronze stems. Gate valves 10 in. and larger shall be by-passed. Globe and angle valves 2½ in. and larger shall be extra heavy pattern, tested to 800 lb. hydrostatic pressure, but otherwise to the same general specification. All stop valves 2 in. and smaller shall be extra heavy bronze, tested to 500 lb. hydrostatic pressure.

Boiler-feed between 125 and 250 lb. per square inch inclusive: Gate valves 2½ in. and larger shall be extra heavy, outside screw and yoke pattern, with semi-steel bodies, bonnets, discs and yokes; bronze seats and disc rings and bronze stems. Globe and angle valves 2½ in. and larger shall conform to the same general specification. Check valves 2½ in. and larger shall be extra heavy pattern, with bronze seats and disc rings. All stop valves and check valves 2 in. and smaller shall be extra heavy bronze. Valves shall be tested to 800 lb. hydrostatic pressure.

Exhaust: Gate valves 14 in. and larger shall be outside screw and yoke, low pressure pattern, suitable for 25 lb. working steam pressure, with gray iron bodies, bonnets, discs and yokes; bronze seats and disc rings and rolled steel stems. Where space does not permit using outside screw and yoke, inside screw patterns may be used. Gate valves 2½ to 12 in. inclusive, shall be standard pattern, outside screw and yoke, suitable for 125 lb. working pressure, with gray iron bodies, bonnets, discs and yokes; bronze seats and disc rings and rolled steel stems.

Gate valves 2 in. and smaller shall be standard brass.

PIPE FLANGES AND UNIONS

Van Stone flanges shall fit the pipe closely. The lap shall be finished off to the inside edge of the bolt holes and faced with a fine tool finish. Screw flanges shall be made up by machine where possible and all extra heavy flanges made up in the shop shall be refaced. Steel flanges shall correspond in thickness to the flanges of the American Standard for Fittings.

Superheated steam: Flanges 6 in. and larger shall be high hub steel, Van Stoned. Flanges 5 in. and smaller shall be steel, screwed.

Saturated steam between 150 and 250 lb. inclusive: Flanges 6 in. and larger shall be low hub steel, Van Stoned. Flanges 5 in. and smaller shall be extra heavy semi-steel, screwed.

Saturated steam between 125 lb. and 149 lb. per square inch inclusive: Flanges 14 in. and larger shall be extra heavy high hub semi-steel, Van Stoned. Flanges 12 in. and smaller shall be extra heavy semi-steel, screwed.

GASKETS

Gaskets shall fit inside of bolt holes for all lines not under vacuum. Vacuum lines shall have full faced gaskets. Sheet gaskets up to and including 12-in. size shall be 1/16 in. thick; and for 14 in. and larger they shall be 3/32 in. thick.

Superheated steam: Gaskets shall be inch Tauril, Durablo, Vanda, Hogart, or corrugated steel coated with Smooth-On cement.

Saturated steam; boiler-feed, blow-off and drains: Gaskets shall be Rainbow or equivalent, or corrugated copper.

Exhaust: Gaskets shall be Rainbow or equivalent.

Suction and low-pressure water: Gaskets shall be cloth inserted rubber.

The Detroit Metal Refining Company, a new corporation, has taken over the old Keeton factory in Detroit, Mich., and converted it into an up-to-date smelting plant. S. Sadek, for years general manager of the Progressive Metal & Refining Company, Milwaukee, will direct the business of the new company, residing in Detroit, but retaining his interests in the Progressive Company. The Keeton plant has 2½ acres of buildings, and its equipment includes forty-eight furnaces. Other officers of the new company are as follows: I. Gerson, Toledo, president; L. R. Grosslight, Detroit, treasurer, and S. Gerson, Toledo, secretary.

Machine tools and parts thereof have been placed on the embargo list by France, effective Aug. 1. Exportation, only in particular cases, is permitted on application to the Minister of Finance.

The World's Largest Copper Mines

Exploitation of the copper mines claimed to be the largest known deposits in the world was inaugurated on May 18, when power was turned on in the big electric plant of the Chile Copper Company at Tocopilla, operating the mill at Chuquicamata, Chile. When completed the mill will have a capacity of 20,000 tons of ore daily, but only one unit of 10,000 tons has been put in operation. Though known to mining engineers of the world over for many years, these low grade deposits remained almost neglected. Native Chileans worked various parts of them in a small way and for a short time an English company unsuccessfully tried to work a portion. In 1910 options for the larger part were secured by Albert C. Burrage of Boston. This resulted later in the organization of the Chile Copper Company, with Daniel Guggenheim president and Mr. Burrage vice-president.

Nickel Output of Canada

The output of copper-nickel matte in Canada in 1914 was 46,396 gross tons, valued by the producers at the smelter at \$7,189,031. It contained 28,895,825 lb. of copper and 45,517,937 lb. of nickel. The ore tonnage smelted was 947,053. The production in 1913 was 47,150 tons of matte containing 25,875,546 lb. of copper and 49,676,772 lb. of nickel. An increase was thus shown in copper content and a decrease in nickel. The world's production of fine nickel in 1913 approximated 34,000 tons, of which the Canadian ore contained 24,838 tons.

The Clinton E. Hobbs Company, 12 Pearl Street, Boston, Mass., has brought out a new line of hoists to take the place of those formerly imported. These hoists, which are known as the Red Line, and are of strictly standard construction, use a double differential sheave cast in one piece to furnish the power and sustain the load. Seven different sizes of hoists are made which range in lifting capacity from $\frac{1}{4}$ to 3 tons and will lift the load from 5 to 9 $\frac{1}{2}$ ft.

The Pratt & Whitney Company has opened an office and showroom at 16 and 18 Fremont Street, San Francisco, Cal., with S. G. Eastman, formerly manager of the Chicago office, in charge. A large stock of Pratt & Whitney machinery, small tools and gages will be carried for the convenience of customers. The company has been appointed agent for the entire Niles-Bement-Pond line of machine tools, cranes, steam hammers, etc.

The Variety Iron Works Company, Cleveland, Ohio, has been awarded the contract for the steel work by the United Furnace Company, Canton, Ohio, which will build a blast furnace. Julian Kennedy is drawing the plans. Aside from this contract and that for the by-product ovens, given to the H. Koppers Company, no other lettings have been made in connection with this furnace project.

The summer course in scientific management for practical men employed in the industries, to be given at the Pennsylvania State College by Prof. Hugo Diemer and W. H. Tabor will be limited to twenty students. The dates of the session were incorrectly given in some of the former announcements. The opening day is Aug. 16.

The American Rolling Mill Company, Middletown, Ohio, has removed its Cincinnati office from the Mercantile Library Building to suite 1409 Traction Building. F. G. Baldwin is the manager of sales at Cincinnati.

The No. 8 furnace of the Thomas Iron Company at Alburts, Pa., which is 60 x 16 ft. and was built in 1869, made a high record output in July at 2125 tons.

Improvements at Robeson Iron Furnace

After an exhaustive study accompanied by numerous practical tests of the possibility of reducing the sulphur content of its ore burden, the Robeson Iron Company, Robeson, Pa., which specializes in low-sulphur low-phosphorus pig iron, has adopted the recommendations embodied in a report by John W. Gocher, consulting engineer, Johnstown, Pa., and is now constructing a plant, under his supervision, to carry out the plan proposed.

At the present time the ore, which is from the well-known Cornwall mines, is roasted in Gjers kilns, the lumps as they come from the mine being roughly broken by hand before charging. It is proposed to crush and screen the ore, all that passes through a $\frac{3}{8}$ -in. screen to be sintered in Greenawalt sintering pans, while for the present all of the coarse ore, ranging in size from $\frac{3}{8}$ in. to 2 $\frac{1}{2}$ in., will be roasted in the Gjers kilns, as heretofore. It is expected that the sulphur content of the fine ore will be reduced from about 2.4 per cent as it comes from the mines to not over 0.2 per cent in the sinter. The coarse ore roasted in the kilns will average about 0.6 per cent sulphur. After a suitable trial period, with various proportions of sinter and roasted ore, if the results are as expected, the amount of sinter will be gradually increased, with the idea of ultimately sintering all of the ore.

The plant will consist of a gyratory crusher, into which the ore cars coming from the mine will discharge, and which will deliver the ore, crushed to pass a 2 $\frac{1}{2}$ -in. ring, onto a slow-moving belt conveyer, which will be used to a limited extent as a picking table. This conveyer will discharge into a rotary screen the fine ore falling through into a 200-ton storage bin and the coarse tailings being discharged onto a second conveyer, located on the charging floor of the Gjers kilns. This conveyer is to be equipped with an automatic tripper which will deliver the coarse ore at various points along the platform, contiguous to the kiln-charging doors.

From the storage bin above mentioned the fine ore will be elevated to the top of the sinter plant mixing house, the same elevator serving also to handle the fine coke which will be used as fuel in the sintering operation. From the bins in the top of the mixing house the ore and coke are to be discharged by gravity into a rotary mixing drum, from which, after being thoroughly and uniformly mixed, they will be delivered into the charging car, which serves the sintering pan. After sintering the pan is turned over and the sintered ore is dropped into a steel storage bin, from which it will be delivered to the furnace charging barrows.

Following this installation, the Robeson Iron Company contemplates spending a considerable sum in improvements designed to reduce operating costs and to utilize the surplus power developed at the furnace. Among the changes to be considered will probably be a bin system in the stock house, with skip hoist and automatic furnace top, an electric light and power plant, appliances for handling the metal in the cast house and storage yard, etc., studies for all of which are being made by the same engineer.

The Metals Coating Company of America, 112 South Michigan Avenue, Chicago, has opened an office at 100 Summer Street, Boston, in charge of Herbert Jaques, Jr., and another at 30 Church Street, New York, in charge of Edward McFarlan. The company uses the Schoop process.

The recent disastrous flood at Erie, Pa., affected very few of the factories. The Griffin Mfg. Company, manufacturer of steel strap and builders' hardware, was not damaged in the least and reports that shipments will go forward from Erie with only slight delay.

The Chicago Pneumatic Tool Company has taken an order for forty Little Giant one-ton trucks from Sulzberger Sons & Co. The company is also exceedingly busy with sub-contracts from the Bethlehem Steel Company.

Pittsburgh Foundries and Machine Shops Actively Engaged

The foundry and machinery trades in the Pittsburgh district are now more active than at any time in months. Many foundries that early this year had but little work on their books, and were not operating at more than 25 to 40 per cent of capacity, are well booked for three or four months and are operating up to 100 per cent. Dealers who sell pig iron to the foundry trade report that nearly all their customers are asking the furnace men to anticipate shipments, showing that the melt of pig iron by the local foundries is very heavy. This increase in operations is due in only slight extent to orders for war munitions, coming largely from an increase in the domestic demand for castings. Very large additions to tin-plate and sheet mills in the Pittsburgh district are now being made, and this is giving much work to the foundries.

The United Engineering & Foundry Company is operating all its plants in the Pittsburgh district to full capacity and has recently started up its foundry department at the Lloyd Booth Works, Youngstown, Ohio, which have been idle for some time. This company has a contract for twelve hot and ten cold mills for the McKeesport Tin Plate Company, McKeesport, Pa., and has other very large orders.

The Mesta Machine Company, West Homestead, Pa., is very busy on castings, engine and general rolling-mill work. It is operating full and has heavy orders ahead for tin-mill work, rolling-mill and blast-furnace engines, pickling machines, rolls and other casting work.

The A. Garrison Foundry Company, on the South Side, Pittsburgh, is filled up for the remainder of the year on its products, which include rolls and rolling-mill and steel-works equipment. This is the oldest foundry in the Pittsburgh district and turns out very heavy work.

Mackintosh, Hemphill & Co., who also build engines and heavy rolling-mill, steel-works and sheet and tin-plate mill equipment, are operating to full capacity with a large amount of work ahead. They have just completed the building of a heavy universal plate mill, with special features, for the United Steel Company, Canton, Ohio.

The Seaman-Sleeth Company, Pittsburgh, builder of rolls exclusively, is also very busy. It is sending part of its output of rolls abroad, having made some time ago a large shipment of rolls to the Broken Hill Proprietary Company, New Castle, Australia.

The smaller foundries that make castings for the local trade are also very busy and have a good deal of work ahead. Prices of castings have shown some improvement, and with the rising tendency in foundry iron are likely to be higher. No notable additions to foundry equipment are being made by foundries in the Pittsburgh district now, but if the present activity continues some of them will have to enlarge their facilities.

The active conditions noted above in the foundry trade are probably more pronounced in the machine shops. The Westinghouse Electric & Mfg. Company, as well known, has received enormous orders for war munitions and is operating its plants night and day. This company has standing advertisements in the daily press for machinists and other hands, and is finding some trouble in getting all the men it needs. All its shops at East Pittsburgh and foundries at Trafford City, Pa., are being operated to utmost capacity, with orders ahead for many months. The Pittsburgh Valve, Foundry & Construction Company also reports conditions very active, and is operating nearly all departments night and day. This company has not yet made any war munitions, but may do so in the near future, as it has inquiries out in the market for equipment for making shrapnel and other war material. The Pittsburgh Machine Tool Company, Braddock, Pa., is extremely busy in all departments, with work ahead for some months. It builds lathes, planers and other iron-working tools. The machine shops operated in connection with the foundries of the local builders of rolling-mill and steel-works machinery are operating full and shipping their product as fast as it can be turned out.

There is a famine in the supply of machine tools in

the district, and concerns that have been in the market for lathes, planers and other iron-working tools report that in some cases they cannot get deliveries, even of two or three tools, inside of four to six months. Of machine tools that many concerns were thinking of ordering a few months ago have been repaired and are now doing duty. Officials of some of the larger foundries and machine shops in the Pittsburgh district say that the present activity is the greatest they have ever known in their experience, and that it promises to continue for some months. During all this period of activity there has been no labor trouble of any kind, but the greatest difficulty has been the scarcity of men.

JUNE FOREIGN TRADE

United States Imports and Exports of Iron and Steel in June

WASHINGTON, D. C., Aug. 10, 1915.—The statistics of the imports and exports of iron and steel, including machinery, for the month of June and for the fiscal year 1915, have been compiled and are presented herewith. They show a decided increase in the tonnage imports for the month of June, but a decrease for the fiscal year 1915; a very large gain in tonnage exports for June, with only a slight falling off for the fiscal year 1915, as compared with 1914; and a moderate gain in the exports of machinery in June, but a substantial decrease in these exports for the fiscal year 1915.

Imports for which quantities are given amounted to 31,610 gross tons in June, 1915, as compared with 23,075 tons for the same month of 1914. This increase amounting to about 35 per cent, is also a gain over imports of May, 1915, which aggregated 28,917 tons. Increased receipts of pig iron and much heavier importations of steel rails account for the gain in June. The tendencies noted in the imports for the eleven months ended May are emphasized in the figures for the full fiscal year 1915. Substantial gains are recorded in receipts of pig iron and steel rails, but in all other important items, notably structural iron and steel, there was a substantial decrease, the total imports for the year amounting to but 251,251 tons as compared with 293,774 tons for 1914.

The details of imports of tonnage commodities in June and in the fiscal year ended with June, 1915, as compared with corresponding periods of 1914, are as follows:

	June		Fiscal Year	
	1914, Gross Tons	1915, Gross Tons	1914, Gross Tons	1915, Gross Tons
Pig iron (including ferro-silicon) .....	.....	.....	238,892	.....
Ferro-silicon	424	386	3,750	6,599
All other pig iron	9,216	9,895	993,802	102,755
Scrap	4,654	2,833	34,310	32,667
Bar iron	1,661	664	21,864	10,284
Structural iron and steel ..	1,106	14	11,031	5,283
Hoop or band iron .....	.....	.....	.....	611
Ingots, blooms and steel billets .....	.....	.....	6,317	.....
Steel billets without alloys ..	84	1	3,465	1,777
All other steel billets	3,476	127	627,822	23,764
Steel rails	798	17,046	15,567	32,092
Sheets and plates	665	101	3,521	2,565
Tin and terne plates	179	75	21,821	4,731
Wire rods	810	468	11,672	4,801
Total	23,075	31,610	293,774	251,251

a Figures cover period July 1, 1913, to Oct. 3, 1913, inclusive.

b Figures cover period beginning Oct. 4, 1913.

The total exports for which quantities are given in June, 1915, were 355,829 tons, as compared with 143,953 tons for the same month of 1914, a gain of 150 per cent. This was also a very heavy increase over the shipments of May, 1915, when the total was 263,736 tons. Nearly all important items in the list shared in the increase. The tonnage commodities for the fiscal year 1915 came within less than 4 per cent of equalling those of 1914, the total being 2,003,798 tons, as compared with 2,076,364 tons.

Details of the exports of these tonnage commodities in June and for the fiscal year 1915, as compared with the corresponding periods of 1914, are as follows:

Exports of Iron and Steel

	June		Fiscal Year—	
	1914, Gross Tons	1915, Gross Tons	1914, Gross Tons	1915, Gross Tons
Iron.....	12,894	22,111	201,995	130,594
Pig iron.....	2,598	7,280	69,282	29,830
Cast iron.....	333	2,273	10,300	12,345
Steel.....	11,929	18,137	56,046	98,441
Bars.....	11,134	58,453	149,113	232,953
Ingots.....				
Nuts.....	5,126	48,999	46,926	220,416
Bolts.....	1,336	1,458	19,827	13,486
Washers.....	744	2,009	11,552	15,097
Rivets.....	39	2,956	1,662	13,017
Shoes.....	351	416	4,525	2,643
Nails.....	773	603	8,645	5,487
Road spikes.....	2,297	10,181	35,853	55,472
Other nails, includ- ing tacks.....	226	1,266	3,184	5,455
Pipe and fittings.....	17,974	5,056	240,724	62,390
Light pipes and fittings.....		15,064		117,695
Cast-iron heating boilers.....	333	206	5,467	2,669
Cast-iron sheets.....	13,161	34,547	338,613	156,587
Other iron sheets.....	3,574	9,913	53,740	54,955
Steel plates.....	1,046	1,239	11,476	9,526
Other plates.....	9,106	22,530	160,390	124,611
Steel sheets.....	12,350	8,973	142,392	96,322
Natural iron and steel.....	15,833	22,812	296,282	168,624
Wire.....	7,180	8,024	47,277	80,456
Wire.....	6,724	22,787	79,775	147,591
Wire.....	6,898	28,536	84,318	147,136
Total.....	143,953	355,829	2,076,364	2,003,798

The total exports of machinery for the month of June and for the two fiscal years 1914 and 1915 are shown in the following table:

	Exports of machinery		Fiscal Year—	
	1914	1915	1914	1915
Mining machinery.....	\$120,859	\$24,220	\$1,670,585	\$448,536
Compressing machinery.....	35,611	43,746	552,587	386,520
Brewers' machinery.....	3,522	21,992	321,888	124,769
Sh registers.....	424,165	138,275	4,834,626	1,371,073
Parts of.....	a	14,860	a	116,663
Tonn gins.....	22,465	3,612	179,404	45,048
Steam separators.....	40,118	25,288	390,313	214,632
Elevators and conveyors.....	185,627	56,506	1,382,893	808,973
Electric locomotives.....	112,697	71,218	437,452	324,478
Engines.....	23,242	28,311	382,613	419,819
Stationary.....	500,181	407,271	6,738,793	4,339,316
Saw engines.....	249,576	139,992	5,208,424	2,690,782
Other engines.....	50,031	67,363	932,078	794,361
Parts of.....	207,116	382,098	3,856,764	2,956,103
Machinery, power.....	38,331	19,681	501,302	277,019
All other.....	70,544	20,564	624,052	217,224
Sawmills.....	35,331	27,370	405,284	291,507
Metal-working machinery (in- cluding metal-working tools).....	1,079,810	3,735,562	14,011,359	28,162,968
Pumps, gas and water.....	b	20,648	b	300,072
Milling machinery (flour and grain).....	66,416	163,687	1,125,669	1,437,968
Mining machinery.....	756,988		9,556,634	
Oil-well ma- chinery.....	c	102,354	c	1,889,347
All other.....	e	453,656	c	4,408,810
Paper-mill ma- chinery.....	46,571	30,225	653,873	706,939
Printing presses, pumps and pumping ma- chinery.....	205,568	173,589	2,487,277	1,431,070
Refrigerating and ice-mak- ing machinery.....	310,790	289,685	3,723,337	2,539,693
Sewing ma- chines.....	75,124	68,920	978,457	636,664
Textile ma- chinery.....	997,919	564,125	11,494,801	6,223,521
Tannery ma- chinery.....	103,320	75,880	1,502,375	1,193,212
Textile ma- chinery.....	143,322	169,738	2,547,662	2,092,016
Typesetting machines.....	153,242	118,280	1,611,279	1,525,644
Typewriting machines.....	147,128	21,559	2,047,469	664,349
Mills.....	806,100	793,770	10,575,573	5,315,134
Food-working machinery.....	104,178	62,892	1,618,349	709,697
Sawmills.....	86,870	30,268	671,305	316,814
All other.....	126,362	81,464	1,383,951	689,738
All other ma- chinery and parts of.....	1,875,451	1,848,312	21,750,386	17,773,245
Total.....	\$9,204,578	\$10,266,981	\$115,658,814	\$93,865,724

Included in cash registers in 1914.
Included in all other machinery in 1914.
Not separately stated in 1914.

The total exports of machinery of all kinds for June, 1915, were valued at \$10,266,981, as compared with \$9,204,578 for the same month of 1914. The phenomenal record of the past few months in the shipments of metal-working machinery was sustained in June of the present year, the exports amounting to \$3,735,562, as compared with \$1,079,810 for June, 1914, almost a fourfold increase. The other items showing an increase in June were air-compressing machinery, brewers' machinery, stationary gas engines, other engines and parts, and flour and sugar mills.

The fiscal year record for machinery of all kinds shows a decrease of nearly 20 per cent, the total for 1915 being \$93,865,724, as compared with \$115,658,814 in 1914. The decrease would have been considerably greater, however, but for the heavy shipments of metal-working machinery, which for 1915 were valued at \$28,162,968, as compared with \$14,011,359 in 1914, an increase of more than 100 per cent. The fiscal year figures show other increases only in stationary gas engines, milling machinery and paper-mill machinery.

W. L. C.

NEW PRACTICE IN UPSETTING

A Method of Removing Metal From the Center of the Piece Without Waste

The Ford Motor Company has placed orders for upsetting machines, the aggregate value of which will approximate \$356,000. This equipment is to be installed in a new building to be erected at once, the extension of capacity being occasioned by the development of a new method of upsetting circular pieces having an open center, such as gear blanks, collars and other forgings ordinarily made heretofore on hammers. It has not been long since it was impossible to secure such pieces with the central hole punched through, all of this metal having to be drilled out. More recently this practice has improved, and the machining required has been limited to drilling the hole to size, although even in this case considerable metal has had to be removed.

The practice which is being developed by the Ford Motor Company for pieces of this character, not only provides for forging the hole in the center within such limits of size as to require only a finishing cut in the machine shop, but results in the piece being formed without any waste of material. Even the flash is eliminated. While the process in general has not been sufficiently completed to warrant detailed description, it consists of upsetting pieces of the general form described, from bar stock of the same diameter as the central hole in the finished forging. The work is done in two or three operations, depending upon the relation of the finished outside diameter of the forging to the diameter of the stock. The diameter of the stock may be safely increased 1½ times. In the first operation the end of the stock is pierced and spread; in the second operation the upset end of the stock is partly formed in a way which prepares for the third and finishing operation the exact amount of metal required, so that the piece finishes without any flash to be trimmed in a final operation. The third operation involves the simple stripping of the forging from the stock, the punching removed from the center of the forging remaining on the bar and being worked up into the next piece, so that there is absolutely no waste of metal. On some pieces it is possible to combine the first spreading operation with the stripping operation which finishes the preceding piece. At the Ford plant an interesting revision of machining operations will follow as a result of this new forging practice.

The Phoenix Iron Works Company, Meadville, Pa., is to enlarge its boiler and tank shops and its foundry, and the capital stock has been increased largely for this purpose from \$200,000 to \$300,000, of which the Meadville Industrial Fund Association is to take \$10,000.

Garland Corporation's \$68,000,000 War Order

The report that the Garland Corporation, Pittsburgh, Pa., manufacturer of rivets, bolts, electric conduit and other products, has secured a contract for \$68,000,000 of war munitions for Russia has been confirmed by President John W. Garland, who said that the negotiations had been completed, but did not specify for publication the kinds of munitions that will be manufactured. Arrangements have been made with manufacturers who will handle different parts of the work, in addition to that to be done at the Garland plants. Deliveries on the contract will extend into the year 1917.

Pittsburgh and Nearby Districts

At the annual meeting of stockholders of the Youngstown Iron & Steel Company, Youngstown, Ohio, held last week, officers and directors were re-elected as follows: John O. Pew, president; W. H. Heedy, first vice-president; C. A. Cochran, second vice-president and secretary; Mason Evans, treasurer; directors in addition to the foregoing: C. D. Hine, G. F. Danielson and C. B. Cushwa. After the meeting a visit was made to the new open-hearth steel plant now being erected by the company at Lowellville, about ten miles distant. This plant will comprise three 75-ton open-hearth furnaces, two 4-hole soaking pit furnaces, one 3-high, 30-in. combination blooming and sheet bar mill, one 24-in. bullhead stand and one 40-in. universal plate mill, with a capacity to roll plates 20 to 40 in. in width. Natural gas will be used throughout as fuel, but a battery of 18 Laughlin gas producers has been built to supply fuel gas, should the supply of natural gas fail. The output of the mill will be sheet bars to be used by the company in its sheet mills at Youngstown, but part of the product will be sold in the open market. It is expected to have the entire plant completed ready for operation about Oct. 1.

The Valley Mold & Foundry Company, Sharpsville, Pa., will build an addition to the present shipping building, to be 50 x 150 ft.; a new casting building, 70 x 390 ft. and a new ladle cleaning and repair building, 75 x 150 ft. Considerable new equipment will be needed in the way of cranes, core ovens and other accessories for the manufacture of ingot molds. This company has turned out in one month as high as 15,000 tons of such molds, and the additions noted will about double the capacity.

On Thursday, Aug. 5, No. 1 furnace of the Shenango Furnace Company, Sharpsville, Pa., made 642 tons of standard Bessemer iron, a record of one day's output for that stack.

The LaBelle Iron Works, Steubenville, Ohio, is now relining and repairing its No. 2 furnace and it will be blown in early in September, the company being badly in need of the metal, as it is now operating ten of its eleven open-hearth furnaces. Its pipe, sheet and other finishing mills are operating to nearly full capacity.

A creditors' petition in bankruptcy has been filed against the Pittsburgh Emery Wheel Company, and the South Side Trust Company, Pittsburgh, has been appointed receiver. The company has a plant at Rochester, Pa., for the manufacture of emery wheels, and the court has directed that the receiver shall operate the business for 90 days to complete orders now on hand.

Unofficial reports credit the Crucible Steel Company of America, Pittsburgh, with contracts on hand for war materials aggregating \$66,000,000. Its new plant now being erected at Harrison, N. J., is being rushed to completion. It is expected to operate this plant 24 hr. a day in three 8-hr. shifts. The old plant at Harrison is being operated night and day and turning out high-grade steel for barrels for the rifles now being made by the Remington Arms Company and Westinghouse Electric & Mfg. Company.

The property of the Leetonia Steel Company, Leetonia, Ohio, will be sold at sheriff's sale Sept. 7 to satisfy the claims of the Commonwealth Trust Company,

Pittsburgh, Pa. The property has been in the hands of a receiver for a year or more. It is appraised at \$100,000.

Operations among the manufacturing plants in the Youngstown district are now on the basis of about 100 per cent. This week the Youngstown Iron & Steel Company expects to operate two of the open-hearth furnaces in its new steel works, making billets.

The Pittsburgh Foreign Trades Commission, which has offices in the Farmers Bank Building, Pittsburgh, reports through its secretary, J. J. Nordman, that active inquiries from France have been received for 4835 cars and coaches, 1750 journal boxes, 744,421 kg. (675 net tons) of drawbars, 107 axle boxes, 600,000 kg. of boiler tubes, three locomotive fire boxes and 10,147 kg. (9 net tons) of drawsprings.

The Driggs-Seabury Ordnance Corporation, Sharon, Pa., manufacturer of motor car forgings, drop forgings and general machine work, has recently sold to the Times Square Automobile Company, New York City, 500 tandem cars of the Twombly type for shipment during the next four months. The corporation is operating its plant to full capacity, with its output practically sold up into next year and states that it expects no trouble in securing plenty of business to operate at full time all of 1916.

The Stirling-Warfel Mill Supply Company, Erie, Pa., has been incorporated with a capital of \$40,000 by John Stirling, Rudolph S. Warfel and Marian Stirling to manufacture mill, marine and factory equipment.

A Proposed Texas Steel Plant

The Texas City Company, recently incorporated at Austin, Texas, has a paid-up capital stock of \$1,370,000, and its announced purpose is to build a steel plant at Texas City. The incorporators are Augustus B. Wilvin and Joseph Cotton of Duluth, Minn.; J. F. Wolters of Houston; Hugh B. Moore and Harvey A. Thomas of Texas City. Mr. Wolvin, who is to be president of the company, has been prominently identified for many years with the development of the port of Texas City. His steamship and other business interests are large. It is stated that iron ore will be brought from the eastern Texas fields, where the company has purchased extensive ore beds.

Trumbull Steel Company Extensions

At a meeting of the stockholders of the Trumbull Steel Company, Warren, Ohio, held Aug. 6, the capital stock of the company was increased from \$2,500,000 to \$4,000,000. The increase will be used for further extensions to the company's sheet and tin plate plant, but definite plans have not been announced as yet.

Further announcement of the plans of the Tacoma Smelting & Refining Company, Tacoma, Wash., has been made by officers of the company, who state that construction running into several millions of dollars will be started immediately. Improvements will include four large steel buildings, large ore bunkers, and nine additional furnaces. The new equipment will double the present smelting capacity of the plant.

The State Industrial Accident Commission of Maryland announces that since it has been in existence, Nov. 1, 1914, reports on 14,804 accidents have been received. Of this number 77 were fatal. Of all the accidents reported 2411 persons injured have filed claims under the workmen's compensation act. Decisions in about 2200 cases have been given by the commission.

A special order has been issued by the Baltimore Car & Foundry Company, Curtis Bay, Md., which requires the employees to wear goggles. It has been found that about 90 per cent of accidents were due to workmen being struck in the eyes by particles of metal.

German Iron Trade Conditions

A German correspondent sends us some interesting developments in the iron trade of his country which have arisen because of the war. He says:

The labor supply has been much curtailed, many workmen from the mills having been called into military service. Not a few of the establishments in western Germany, it is said, have begun to take on women for such work as they are able to do. Prisoners of war are also employed in considerable numbers, but these have not proved satisfactory, owing to their unwillingness to work steadily. Thus an increase in the cost of production has occurred along the whole line, and prices have been raised accordingly. The past month was especially characterized by a sharp upward movement of prices, and not a few classes of iron and steel products are now sold at record-breaking figures. The advance begins with iron ore and extends to all products except scrap. The price of scrap has actually weakened owing to the large supply coming on the market. The many establishments now manufacturing artillery ammunition are offering scrap in large quantities; the railroads have much old iron and steel for sale, and considerable material from conquered territory is also available. Under these circumstances the make of steel is running well above the production of pig iron.

The demand for ore is remarkably active, having been intensified by the shortage of foreign raw material. It is even reported that many of the big heaps of slag in the Siegerland district have been sold to be shipped to furnaces in Lorraine and Luxemburg. Prices for Siegerland ores have again been raised 25c. to 50c. per ton. Very large quantities of pig iron, especially iron of superior quality, are being called for to be used in making shells.

The military authorities are now heavily using steel bands in the preparation of artillery ammunition, substituting them for purposes where formerly brass or copper was used. Hot-rolled soft steel bands are selling at 160 marks (\$38.08) for the current quarter, or 180 marks (\$42.84) for open-hearth steel. Cold-rolled bars are now being taken almost wholly by the government, and the makers have no grounds to complain of the amounts called for. The mills can scarcely keep up with their orders for heavy plates. The former overproduction of plates no longer exists, some of the mills having had to shut down owing to lack of workmen. Prices have recently been advanced to 150 marks (\$35.70) for ordinary heavy plates, and 165 marks (\$39.27) for boiler plates. The wire mills are busy on their reduced scale of production, and the greater part of their output is taken by the army. Very large quantities of barb wire are still being used for making entanglements before the trenches. The export of wire is now nominally prohibited, but permission to make shipments to the small neutral countries can usually be obtained without great difficulty. Wire rods have recently been advanced to 145 to 150 marks (\$34.51 to \$35.70). Wire nails are selling at 170 marks (\$40.46) per metric ton, or 1.8c. per pound. The tube mills are busy, some of them working almost wholly on army contracts, and can scarcely fill orders on time. Machine shops are actively engaged, mostly on government orders or on orders from other shops that need machinery with which to fill government contracts. Lathes for finishing shells are, of course, in great demand.

A serious effort has been made within the past two or three months to bring all lines of steel production into a single great organization, and it looked at one time as if the circumstances created by the war would render such a result possible. A further meeting on the matter was held some time ago, however, at which the general expression was decidedly unfavorable for the adoption of such a scheme.

The shipments of the German Steel Works Union in June were 318,952 metric tons, compared with 288,566 tons in May, an increase of 30,386 tons. The June shipments are 32,608 less than those of March, which were the best since the war started. Of the total June shipments this year semi-finished steel constituted 77,804 tons; railroad material, 154,736 tons and shapes, 86,412 tons.

MACHINE GUN MOTOR TROOP

Feature of the Military Training Camp at Plattsburg, N. Y.

Men well known in the steel trade have been particularly interested in one feature of the military training camp for business and professional men at Plattsburg, N. Y., and that is the organization of an experimental motor-transported machine gun troop equipped with twelve or fifteen automobiles and motor trucks, twenty machine guns, and two one-pounders. There are about seventy men in this troop—lawyers, bankers and business men from New York, Boston, Philadelphia, Pittsburgh, and elsewhere. They are graduates of Harvard, Yale, Princeton and other colleges. Among the Pittsburgh men are D. A. Reed of the Steel Corporation's counsel, A. R. and R. E. Flinn and Charles Dupuy. Among the New York men are R. L. Bacon, son of Robert Bacon; A. A. Fowler, resident partner in Rogers, Brown & Co.; J. G. Milburn, and Langdon P. Marvin, secretary of the New York Harvard Club.

The troop has been organized and is officered by Raynal C. Bolling, general solicitor of the United States Steel Corporation, captain; George W. Hubbell, Jr., first lieutenant, and H. B. Clark, of White, Weld & Co., second lieutenant, all former members of Squadron A of the New York National Guard. The necessary funds have been contributed by Judge E. H. Gary, George W. Perkins, J. P. Morgan, Brown Brothers, Potter, Choate & Prentice, and White, Weld & Co.

The European war has proved the importance of machine guns. This was first realized by Germany, whose armies have been provided with great numbers of machine guns, much in excess of the numbers furnished by the Allies to their armies. In one case it is reported that 500 English troops were four days in taking a German trench, with heavy losses, only to find in the trenches five machine guns and fifteen German soldiers.

In the United States army, as in most others prior to this war, four to six machine guns were considered sufficient for each regiment of 1000 men. Some military authorities now believe there should be at least twenty-four machine guns to each regiment. Moreover, it is essential that these machine guns, with their crews, ammunition and equipment, be capable of rapid movement for considerable distances. By transporting the guns, crews and ammunition in automobiles, guns can be taken in two or three hours over distances heretofore requiring from one to three days. But no experiments in motor transported machine gun units have been made by the United States Army or the National Guard because no funds or opportunities for such experiments have been provided.

It is for the purpose of conducting such experiments that this motor machine gun troop has been organized. From its experience some data should be obtained to show what kinds of motor cars and trucks are suited to such purpose, how many guns and men can be transported to advantage upon one car or truck, how far such units can travel in an hour or a day over different kinds of roads, in what sort of country they can be operated effectively, and many other things which are now merely matters of speculation and opinion.

With all the financial support given by business men the experiment could hardly have been conducted but for the assistance of the motor car manufacturers, who have furnished cars and in some cases equipped them.

This experimental motor-transported machine gun troop left New York Saturday, Aug. 7, going over the roads to Plattsburg, where it will participate for four weeks in the work of the military training camp. It will return over the roads to New York and there will be sent to the War Department a detailed report of its experience.

The American Woodworking Machinery Company has moved its New York office from 90 West Street to 30 East Forty-second Street.

PERSONAL

Simon S. Martin, formerly general superintendent of the Maryland Steel Company, Sparrows Point, Md., has been elected vice-president and a director of the Algoma Steel Corporation, Sault Ste. Marie, Ontario.

Edward W. Parker, who for a quarter of a century has prepared the annual reports of the United States Geological Survey on the production of anthracite and bituminous coal, has been selected to take charge of the Anthracite Bureau of Information supported by the anthracite coal-mining operators, including both the large companies and independents, and covering the entire region. The objects of this bureau are to collect, compile and distribute information regarding the anthracite industry, and it is located at 1032 Miners Building, Wilkes-Barre, Pa. Much of this work has for a number of years been handled by the Bureau of Anthracite Coal Statistics, under the direction of the late W. W. Ruley, and since his death it has been in charge of A. H. Armstrong. But the scope of the new bureau will be considerably extended. The Bureau of Anthracite Coal Statistics will be merged with the new bureau and moved to Wilkes-Barre, and it is understood that Mr. Armstrong will remain in charge of that portion of the work.

G. W. Elmendorf, mechanical engineer, connected with the Lidgerwood Mfg. Company, New York, has accepted a position with the E. A. Kinsey Company, Cincinnati, Ohio, Central Western representative of the Lidgerwood Company, and will have charge of the hoisting engine sales department.

Marshall K. McCosh, formerly in the sales department of the Pittsburgh office of the American Sheet & Tin Plate Company, has been transferred to Cincinnati.

Dr. J. Puppe, Germany, has appointed, as his American representative, F. J. Denk, Steel City Engineering Company, Pittsburgh. Dr. Puppe, who has conducted extensive tests and researches for more than 10 years, in order to determine the power required to roll steel, has developed a new type of beam mill, which he desires to introduce in this country.

W. S. Burgess has disposed of his interest in the Stoddard-Burgess Company, manufacturer of brass and aluminum castings, 426 South Clinton Street, Chicago, to E. B. Stoddard, who will continue the business. Mr. Burgess was for eight years salesman for the Imperial Brass Mfg. Company.

D. W. Kerr, who has been secretary and treasurer of the Trumbull Steel Company, Warren, Ohio, since its organization, has been made vice-president.

C. B. Hopper, representing the National Screw & Tack Company and the Cleveland Bolt & Mfg. Company, Cleveland, Ohio, has opened an office at 508 Mercantile Library Building, Cincinnati, Ohio.

Holladay, Negstad & Co., 109 North Dearborn Street, Chicago, announce their incorporation for the practice of consulting engineering in the field of power plants, utilities and industries. The company represents the association of Lewis L. Holladay with Henry Negstad.

Armand Alexandre, St. Louis representative of the Ohio Iron & Metal Company, who has been quite ill for some weeks, has sufficiently recovered to resume his duties in management of the company's business in the St. Louis district.

Henry A. Getty, Worcester, Mass., has become affiliated with the Eastern sales department of the Columbia Steel & Shafting Company, Pittsburgh, maintaining offices and warehouse at 46-48 Midway Street, Boston, Mass., of which J. E. G. Coxwell is manager. Mr. Getty will travel in eastern New England.

W. P. Cochran, formerly branch manager of the Westinghouse Electric & Mfg. Company at Baltimore, has been appointed assistant district manager of the

Philadelphia district, including Baltimore, and will make his headquarters in Philadelphia. M. H. Jones, assistant to the manager, will have charge of the Baltimore branch office.

Samuel D. Fitton has been elected vice-president of the Niles Tool Works Company, Hamilton, Ohio, to fill the vacancy caused by the death of the late George T. Reiss.

John W. Harrington, Harrington & Richardson Arms Company, Worcester, Mass., returned last week from Europe, after an absence of four months, divided between Paris and London.

James A. Green, president of the Matthew Addy Company, Cincinnati, Ohio, is spending the hot season at his summer home in Canada.

Augustus Wood, who for 10 years has been chief draftsman of the Niles Tool Works Company, Hamilton, Ohio, has been appointed general manager. He had been acting in that capacity for nearly a year, but the formal announcement of the appointment was not made until last week.

Henry L. Extein, with the Joseph Joseph & Brothers Company, New York, has suffered the loss of his father, who died in Buffalo last week. His father was Hiram Extein, who had been not only a prominent merchant in that city but was actively identified in movements contributing to the public welfare.

Clarence J. Wetsel, general manager of the Page-Storms Drop Forge Company, Chicopee, Mass., has severed his connection with the company. At the annual meeting of the directors President F. F. Storms was elected general manager as well as president, and W. L. Washburn assistant manager. C. P. Fay was re-elected vice-president and assistant treasurer, and F. H. Page was re-elected treasurer.

NEW OHIO STEEL PLANT

United Steel Company to Build Five Open-Hearth Furnaces—Other Extensive Additions

The United Steel Company, Canton, Ohio, will shortly begin the erection of a new steel plant which will include five 75-ton open-hearth furnaces, with provision for seven additional furnaces later; a 36-in. blooming mill and a sheet bar mill. The mills will be electrically driven. The new works, which will be known as plant B, will supplement the present open-hearth steel furnaces known as plant A, and when fully completed will more than double the company's capacity. The new plant, when the twelve open-hearth furnaces are erected, will have a capacity of about 40,000 tons per month. Work will be rushed and it is the intention to have three of the furnaces ready for operation next April. The equipment will include gas producers and a 250-ton mixer. Hot metal will be supplied by the new 500-ton blast furnace to be built adjoining the two steel plants by the United Furnace Company, recently organized by the combined interests of the United Steel Company and Pickands, Mather & Co., Cleveland. As the increased capacity will require more pig iron than the stack will produce, the company will continue to be a buyer of basic pig iron. Gas for the steel plant will be furnished by the by-product coke ovens to be erected in connection with the blast furnaces. The contract for the open-hearth furnaces has been placed with the S. R. Smythe Company, Pittsburgh.

The United Steel Company is making further additions to its present plant. Besides an eighth open-hearth furnace and a 15-ton Heroult electric furnace recently mentioned, contracts have been placed for a 26-in. Lamberton billet and jobbing mill which, it is said, will be the first of this English type to be installed in the United States, also for a new 8-in. bar mill as well as for other improvements. The total outlay for the extensions will amount to about \$5,000,000, including \$2,000,000 for the new steel plant, \$2,000,000 for the blast furnace and coke ovens, and \$1,000,000 for the extensions to the present steel plant.

OBITUARY

DORMAN J. SINCLAIR, Steubenville, Ohio, a leading banker and a director of the La Belle Iron Works, was killed Aug. 6 by a train on the Cleveland & Pittsburgh Railroad, which passes through the plant of the company. He was alone, and had a blueprint in his hands looking at the proposed location for the by-product coke plant. He had stepped from one track to another. He was 56 years old and for 35 years was cashier of the Union Deposit Bank of Steubenville, which recently merged with the Union Savings Bank & Trust Company. He was instrumental in getting some large industries to locate in Steubenville, and secured the site on which the plant of the Phillips Sheet & Tin Plate Company is located at Weirton, W. Va. He also financed some large projects, these including the building of bridges across the Ohio River and the building of trolley lines from Weirton and Follansbee to Steubenville. He was president of the Chamber of Commerce and for years had been a director of the La Belle Iron Works. He leaves his widow and four children.

ALLAN STRALE, chief engineer of the Inland Steel Company, Chicago, almost from the inception of the Indiana Harbor works until two years ago, when he became chief engineer for the H. Koppers Company, died suddenly at his home in that city Aug. 5, of heart failure, aged 54 years. He was born in Sweden and was a graduate of the University of Stockholm. He had resigned from his connection with the H. Koppers Company at the time the general offices of that company were moved from Chicago to Pittsburgh and had been engaged in a consulting practice, supervising, among other work, the construction of the Inland Company's benzol plant. His unusual engineering ability was widely recognized.

GEORGE LORD GRAVES, vice-president Fuller-Warren Company, stove and range manufacturer, Milwaukee, Wis., died suddenly at his home Aug. 4, aged 72 years. He was born in Tecumseh, Mich., and was graduated from the University of Michigan in 1868. Upon the organization of the Fuller-Warren Company he was elected vice-president and held the position until his death. He had been identified with the iron and mining business for many years, being associated with J. J. Hagemann in numerous enterprises.

HENRY C. JUDD, Hartford, Conn., a director in the Aetna Nut Company, and Landers, Frary & Clark, Inc., died July 30, aged 88 years. He was one of the leading business men of Hartford, being a large wool merchant and interested in banking and insurance. He leaves his widow, two sons and a daughter.

Koppers Plant at Cleveland

Corrigan, McKinney & Co., Cleveland, Ohio, have placed with the H. Koppers Company a contract for the by-product coke plant to be erected in connection with their blast furnaces in Cleveland. There will be 204 Koppers ovens with a capacity of about 12½ tons each, being sufficient to supply coke for the firm's two present blast furnaces, the one now being built, and a fourth to be built later.

The Willys-Overland Company, Toledo, Ohio, has announced a voluntary reduction in the working hours at its plant from 50 to 48 per week, effective Nov. 1. No reduction in pay will be made. Time and one-half will be allowed for overtime and double time for Sundays and holidays. This follows a 5 per cent increase in wages voluntarily granted six weeks ago.

The Eagle Pipe Supply Company, Inc., formerly of 45 Broadway, New York City, is now located at 30 Church Street. The company specializes in new and second-hand pipe, both black and galvanized, in sizes ranging from ¾ to 20 in. in diameter, and is also prepared to cut, thread and drill pipe to specifications.

FORD RAW MATERIALS PROJECT

A Foundry Without a Cupola and Coke Ovens Without a Quenching Station

The recent completion of the period of development and testing of the Ford farm tractor by Henry Ford, Detroit, Mich., and the decision to enter upon its manufacture on a large scale, made of immediate importance the question of raw material supply. The Ford Motor Company is already melting some 350 tons of pig iron daily. In the coming year this consumption will be increased fully 50 per cent to meet motor car requirements and will be more than doubled with the beginning of tractor building. The desire to put the foundry operation, which is assuming such magnitude as to make its efficiency a fundamental requisite to the success of the entire manufacturing process, upon a basis of maximum economy is largely responsible for the proposal to build blast furnaces and rolling mills.

CASTINGS FROM BLAST FURNACE PRODUCT

The decision of the company to build its own blast furnaces is not occasioned to any extent by a hope of better deliveries or a better product, for satisfactory conditions in these respects have been generally obtainable. A larger advantage is hoped to be reached in the practice of unusual economies not generally possible, among which will be the elimination of the cupola. The plans of the Ford Company in connection with this new project are scarcely farther advanced than the mere idea, and their formulation is only now being undertaken.

The site which has been secured for the erection of the new works, located on the River Rouge, is 18 miles from the present plant of the Ford Company, with which it will be connected by a company railroad. The foundry operations of the present plant will be moved to the new site to secure immediate proximity to the blast furnaces. It is then proposed to use the hot metal from the furnaces, directly pouring the castings without any cooling of the iron. It is expected that the melt, at the time the furnaces are completed, will take the output of two 300 to 400 ton stacks, although the proposed layout will provide for subsequent building of additional furnaces.

The feasibility of this direct metal proposal is increased by the fact that the present foundry practice of the Ford Company uses the same iron for all of its castings, the cupola charge being such as to yield a so-called semi-steel mixture. The methods by which the blast-furnace operation may be made consistently to yield iron of one analysis, and the devices for hot metal storage and mixing during the interval between tapping the furnace and pouring the mold, though still in embryo, will not entirely lack precedent in standard commercial practice.

SUGGESTION TO CHARGE INCANDESCENT COKE IN FURNACE

It is the intention, as well, to include in the blast-furnace project by-product coke ovens for the economical production of fuel and the corollary provisions for the utilization of by-products. Perhaps the most revolutionary conception involved in the proposals for the new plant is Mr. Ford's suggestion that incandescent coke will be used by direct transfer from the ovens to the blast furnace without quenching. Obviously this proposal is startling, more from a metallurgical standpoint than from a mechanical, and, if the attempt is not abandoned, the experiments of the Ford Company in the accomplishment of this feat will unquestionably make a most interesting record.

SHEET AND BAR MILL PROPOSED

The development of the mill end of the works will first include a sheet mill and a bar mill, but the intentions of Mr. Ford do not stop short of an ultimately self-contained operation. The organization of a fleet of boats, both for ore traffic and the export shipment of cars and tractors, has also been considered. Work is now under way on the layout of the plant, and the steps preliminary to actual construction are to be pushed as rapidly as possible.

Machinery Markets and News of the Works

INDUSTRIAL REVIVAL HERE

New Inquiry for Tools Appears Steadily

Manufacture of Lathes Contemplated by Firms Which Are New to the Business—Others Are Making Parts

A general revival of industry is strongly in evidence throughout the country. It is exemplified in the formation of new companies, building of new plants and extensions to old ones, and is of greater importance to the country at large than the immense orders which have been placed for munitions and the machines for making them. Of course, a good part of the activity is inspired, though often remotely, by war business. The demand for machine tools for the manufacture of shells is almost unlimited, new inquiry for large groups of machines coming out practically day by day. In New York the representatives of some tool builders are refusing orders unless deliveries can be made well into next year. In various sections of the country new projects contemplating the manufacture of machine tools are springing up. The Buckeye Engine Company, Salem, Ohio, is reported to be preparing for the manufacture of metal-working tools. In a small way, at first, the Superior Machine Tool Company, Kokomo, Ind., is equipping for the building of lathes. C. M. Conradson, Fond-du-lac, Wis., is also to make lathes, and there are numerous others who are either attempting to make complete machines or are making parts for established machine tool builders.

The Cleveland Machinery & Supply Company has taken an order from the Chester Engineering & Ordnance Company, Chester, Pa., for 518 lathes for making 3 to 5 in. shells, 500 of these being single-purpose machines and the remainder standard tool-room lathes.

The Garland Corporation, Pittsburgh, Pa., confirms the report that it has secured a contract for \$68,000,000 worth of war munitions from Russia. The work will be done not only at the Garland plants, but also by manufacturers whose co-operation has been arranged for.

The Automatic Transportation Company, Buffalo, is in the market for a large list of tools for the manufacture of shells, and fresh demand has reached New York from Russia and England. The top speed at which New England is working is evidenced by the fact that freight traffic in New Haven has increased 25 per cent over previous high records. The Lake Torpedo Company, Bridgeport, Conn., has purchased 20 acres of land on which it will erect a new plant for the construction of submarines. There seems no end to the demand for lathes in Cleveland, one inquiry calling for 1000 machines. Most of it is war business, but the automobile makers are good buyers. In Cincinnati some of the automobile makers are turning their attention to the making of lathes. Like other sections Milwaukee reports new industries and every appearance of a sound revival of industry.

In the Birmingham district there is a notable change from steam to electric power in mills and mines

which is conducive to business. In the Central South the demand for boilers is good, but prices are considered as too low. In San Francisco trade is picking up partly because of demand from Australia and the Orient for goods formerly bought from Europe. In the Pacific Northwest there are indications of a coming boom in shipments to Europe by way of Vladivostok for the accommodation of which ships are being purchased.

New York

NEW YORK, N. Y., AUG. 10, 1915.

The demand for machinery maintains its unusually high level. While domestic demand has improved recently, it cannot be gainsaid that by far the greatest part of orders placed is for the manufacture of war supplies. Dealers do not agree as to the conditions of domestic demand, individual opinion depending on the particular class of machinery involved. Much more business can be traced to war demand than is commonly supposed. Some machine-tool dealers report practically their entire business being taken for such work. One manufacturer of heat treating equipment has done more business in the past six months than in the previous four years.

Inquiry is probably greater than ever. For some companies the only way that remains to increase their output of machine tools would be to license their customers to manufacture from their blue prints. This is against the policy of many and in several cases branch offices have been notified to refuse orders for some time to come, or else to accept only orders for delivery well into next spring. The amount of war contracts and sub-contracts that are going begging for lack of shops that can undertake them would be astonishing if they could be brought together.

The unusual conditions in the trade have brought about some interesting new ways of doing business. The telegraph and telephone wires are continually humming with entreaties for delivery, demands for options, a promise of a machine soon or a request for quick and definite action. New York offices call up their headquarters no matter how far west as quickly as they would call up a local company. Cablegrams of over 400 words and telephone bills of over fifty dollars are not unusual. The case is cited of one customer who paid a bill of over \$100; he talked to headquarters in regard to delivery. Nearly every dealer in the city has a telephone and telegraph bill anywhere from ten to twenty-five times larger than they have ever had before.

Large orders for foreign shipment are being placed. The aggregate of miscellaneous business is large. The Seaboard Air Line Railway has not closed for its requirements as was recently reported, but it is understood that the delay was due to causes which have now been eliminated. The Southern Pacific is inquiring for several tools and the New York Central for two or three.

Worham, Sanger & Bates, Inc., 30 Church Street, New York, are inquiring for turret and capstan lathes and milling machines to manufacture quick-firing guns, rifles and time fuses for Russia, and hydraulic machinery to make 30,000 6-in. shells a month, working 100 hr. a week.

William McLean & Co., 12 East Elizabeth Street, Melbourne, Australia, who have temporary headquarters at 2123 North Capital Avenue, Indianapolis, Ind., are buying steel and automobile accessories in this country.

W. W. Gibbons is at the Hotel McAlpin, New York City, and is buying machinery for C. W. Burton, Griffiths & Co., Ludgate Square, London, E. C., England, merchant engineers.

The Automatic Transportation Company, 2933 Main Street, Buffalo, N. Y., is in the market for equipment for the manufacture of 3-in. shells, for which it has been awarded a contract. It expects to close contracts for this equipment within a week or ten days, and desires full specifications, prices and positive date of delivery. Its requirements are: twenty-five boring machines, three banding machines, six 16-in. and 18-in. heavy duty lathes, three centering machines, three high-speed drilling machines, two universal filing machines, two universal grinding machines, six tool grinding machines.

The Maag Gear Company, 1876 Broadway, New York, gear cutting contractor, has increased its capital stock from \$50,000 to \$120,000 and is adding to its working capital. It is equipping its plant at Yonkers, N. Y., to provide for a large expansion in its capacity. Albert T. Otto is president.

The Rochester Welding Works, 406 Orchard Street, Rochester, N. Y., are building a one-story oxy-acetylene welding plant, 26 x 68 ft., to cost about \$4,800.

The Hewitt Bearing Metals Company, Berkeley Avenue and North Sixth Street, Newark, N. J., whose plant was recently totally destroyed by fire, will rebuild its foundry and equip it with the latest devices to give it double its former capacity. It will manufacture rolling-mill bearings and car, motor and armature bearings and bushings. Christian Frang is president and R. G. Holbrook general manager.

The Empire Axle Company, Dunkirk, N. Y., which is planning to enlarge its plant, is increasing its capital stock from \$20,000 to \$100,000.

The Ludlum Steel Company, Watervliet, N. Y., is completing an addition to its melting shop, 80 ft. square. It has been working a night shift for several weeks.

The Folding Barrel Company, 220 Broadway, New York City, has purchased one and one-half acres of land at Rochester, N. Y., and plans to erect a factory to cost about \$10,000. F. J. Pomeroy will be factory manager.

The Submarine Boat Corporation, 40 Wall Street, New York, has been incorporated with a capital stock of \$4,000,000, fully paid in, by James S. Sandefur, 601 West 140th Street, Edward Roder, Richfield Park, N. J., and others. Rushman, Birker & Stern, 40 Wall Street, are the attorneys. It is surmised that the new company is backed by interests formerly in control of the Electric Boat Company, Bayonne, N. J.

The Wesson Piston Ring Company, 1123 Clinton Street, Hoboken, N. J., has purchased four acres of land at New Brunswick, N. J., and has awarded contract to Westinghouse, Church, Kerr & Co., 37 Wall Street, N. Y., for a two-story factory, 60 x 300 ft., with an ell 60 x 160 ft., of steel and concrete construction, to have a capacity of over 25,000 piston rings per day. Marshal F. Mills is treasurer and general manager.

Lockwood Greene & Co., 101 Park Avenue, New York, are talking bids for the construction of a 1½-story storehouse and brass foundry, 100 x 200 ft., to be erected at Totenville, Staten Island, for the Nassau Smelting & Refining Company, 301 West Twenty-ninth Street, New York.

It is reported that The Hunter Arms Company, 67 Hubbard Street, Fulton, N. Y., contemplates the construction of two factory buildings to cost about \$30,000.

The American Machine & Foundry Company, 346 Carroll Street, Brooklyn, N. Y., has awarded contract to the H. D. Best Company, 52 Vanderbilt Avenue, New York, for a factory and power house, 4½ stories, 100 x 700 ft., to be erected on Fifty-sixth Street, between First and Second Avenues, Brooklyn, at an estimated cost of \$500,000.

The Passaic Valley Sewer Commission, Newark, N. J., will receive bids Aug. 31 for the construction of superstructure of the Newark Meadows Pumping Station. J. H. Quitt is clerk of the commission.

The General Abrasives Company, Niagara Falls, N. Y., has been incorporated with a capital stock of \$105,000 to manufacture machinery and abrasive goods. The directors are Frank D. Hamilton, Springfield, Mass., Thomas D. Allen, Augustus G. Porter, Roy Fradenburg and William J. Robido, all of Niagara Falls. It has let contract to Braas Brothers, Niagara Falls, for the construction of a turnace building, 40 x 220 ft., to be erected at Sugar Street and Whirlpool Avenue.

The Wilfred Hall Laboratories, Portchester, N. Y., of which F. R. Davis is manager, has let contract for erection of chemical plant, 83 x 103 ft., three stories and basement, to Sullivan & McNally, Paterson, N. J.

The Bedford Mfg. Company, Mount Vernon, N. Y., manufacturer of spark plugs, has let contract for the two-story factory it is to erect at Pearl Street and Fourteenth Avenue to McKean & Black.

The Chester Ship Building Company, Millbrook, N. Y., capitalized at \$1,500,000, has been incorporated by G. F. R. Abbott, 3161 Broadway, New York City, Ferdinand H. Bushart and Tracy S. Buckingham, Brooklyn.

The Sauquoit Toilet Paper Company, New Hartford, N. Y., has let general contract for erection of its new mill to R. H. Richards & Son, Utica, N. Y. It will erect two buildings, 101 x 142 ft. and 58 x 194 ft., both three stories, to cost approximately \$100,000.

The Hall-Welster Company, Attica, N. Y., has been incorporated with a capital stock of \$50,000 to manufacture adding machines, cash registers, etc. The incorporators are W. L. Ayrault, C. B. Benedict and G. A. Hoy, Attica.

Incorporation papers have been filed by the Wonder Worker Toy Company, Lockport, N. Y., to manufacture toys, novelties, etc. LeGrand O. Robson, 240 Pine Street, Lockport; Clifford R. Hammond, 802 Elmwood Avenue, Buffalo, and Walter E. Thayer, Lockport, are the incorporators. The capital stock is \$10,000.

Contract has been let for erection of a three-story factory, 60 x 170 ft., for Samuel Shapiro, 581 South Clinton Street, Syracuse, N. Y.

The Lock City Liquid Cooling Company, Lockport, N. Y., has been incorporated, with a capital stock of \$25,000, to manufacture cooling and liquid saving devices. The directors are J. McGlynn and J. A. Burke, Lockport, and G. A. Stricker, 341 Ellicott Square Building, Buffalo.

An electric light plant is to be constructed by Frank E. Hamm, Ellisburg, N. Y.

Sealed proposals will be received by the board of contract and supply of the city of Albany, N. Y., until Sept. 7, for the construction of two sewage pumping stations, comprising a main pumping station, gate house, tool-house and auxiliary automatic pumping station; also separate sealed proposals for the equipment of these stations, which will include three motor-driven centrifugal pumps of 10,000,000-gal. daily capacity, three of 15,000,000-gal. daily capacity and two of 1,500,000-gal. daily capacity, with fittings, etc. Isadore Wachsmann is secretary of the board.

The Buffalo Cold Storage Company will erect a ten-story cold storage building at Perry and Columbia Streets and the Lehigh Valley Railroad.

A one-story factory, 41 x 80 ft., is to be erected at Troy, N. Y., by W. E. Martin & Son.

The Snow Steam Pump Works, Buffalo, a subsidiary of the International Steam Pump Company, 115 Broadway, New York, is engaged on orders amounting to between \$400,000 and \$500,000 for powerful hydraulic presses and other hydraulic equipment, which it is stated may be used by the purchasing company for making shrapnel shells. A large quantity of material is also being made at this plant for companies engaged in the manufacture of benzol and the American corporations that have entered the aniline dyes field.

New England

BOSTON, MASS., Aug. 9, 1915.

The top speed at which New England metal-working industries are working is well illustrated by the fact that freight traffic in New Haven, Conn., has increased 25 per cent over the greatest it has ever been before. In one week recently 4200 freight cars were handled. Around 600 cars are handled regularly every day. Many companies continue to increase their working time as well as their manufacturing facilities. The Skinner Chuck Company, New Britain, Conn., will put its entire plant on a 9 p. m. schedule. The New Britain Machine Company and the North & Judd Mfg. Company, in that city, are also working their plants night shifts.

About 2000 men are now building and installing equipment in the three factories of the New England Westinghouse Company, at Springfield and Chicopee Falls. It is stated that operations will probably not start Sept. 1 as was originally planned. It has purchased the plant and equipment of the Meriden Arms Company, Meriden, Conn., owned by Sears, Roebuck & Co., Chicago, Ill., at a reported price of over \$500,000. The factory, which employs normally about 500 men, will probably be used to fill the Russian rifle contract recently taken.

The Piling Brass Company, Meriden, Conn., has awarded contracts to George A. Uphan for a one-story brick factory, 50 x 70 ft., to be erected on Watertown Avenue.

The Scovill Mfg. Company, Meriden, Conn., has awarded contract to George A. Uphan for remodeling a building for a hospital.

The Geometric Tool Company, manufacturer of special machinery and tools, New Haven, Conn., within the past few months has added equipment which nearly doubles its capacity in several departments. It is now figuring on a two-story addition, 196 ft. long, to be completed Nov. 1.

The Bausch Machine Tool Company, Springfield, Mass., will build an addition to its plant, 41 x 50 ft., to cost about \$11,000. J. G. Roy is the contractor.

The Fisk Rubber Company, Chicopee, Mass., has awarded contract to the Fred T. Ley Company, Springfield, for the erection of a new building, five stories, 110 x 600 ft., of brick and steel, to cost about \$300,000. It recently completed a seven-story addition to its mills, and is now erecting two more buildings.

P. E. Sommers, Worcester, Mass., manufacturer of tacks,

has had plans drawn for a one-story brick addition to give about 6000 sq. ft. floor space. Edward T. Fitzgerald is the architect.

The Worcester Brush & Scraper Company, Worcester, Mass., has been incorporated with a capital stock of \$25,000. Gilbert C. Bemis, 37 Shattuck Street, is president and Raymond B. Fletcher, 6 Tirrell Street, vice-president.

The Charles Buck Edged Tool Company, Millbury, Mass., has been sold to Buck Brothers, manufacturers of edge tools, Millbury, at an estimated cost of about \$15,000.

The Crompton & Knowles Loom Works, Worcester, Mass., plans an addition to its foundry which will increase the capacity about 75 tons a day. When completed the company will discontinue its Star foundry.

The C. A. C. Lubricants Company, Worcester, Mass., has been incorporated with a capital stock of \$100,000 to manufacture lubricant oils and greases. Andre Jamellier, 443 North Main Street, Springfield, Mass., is treasurer.

The Roper Lumber & Box Company, Princeton, Mass., suffered a loss from flood of about \$7,000. It is said much equipment was damaged.

The Bath Grinder Company, Fitchburg, Mass., has increased its production from 40 to 78 hr. a week and its working force from 40 to 100 men in the last few months.

The American Tube Works, 10 Oliver Street, Boston, Mass., has plans prepared for a rolling mill, 178 x 248 ft., one story, of brick, to be added to its plant at Somerville, Mass., at an estimated cost of \$58,000.

The Wright Mfg. Company, Worcester, Mass., has reopened its plant at Palmer, having settled the recent labor difficulties.

The Kinney Mfg. Company, Boston, Mass., manufacturer of pumps, etc., has purchased the plant of The American Linen Thread Company, at Jamaica Plain, Boston, which it will occupy and put in operation about Sept. 1.

The J. L. Hammett Company, 250 Devonshire Street, Boston, Mass., manufacturer of screw supplies, has let contract for a factory, three-stories and basement, 100 ft. square, to be erected at Hayward and Main Streets, Cambridge, Mass.

The Highgrade Incandescent Lamp Company, Salem, Mass., has plans prepared for an additional factory, 52 x 202 ft., to be erected on Boston Street near Bridge Street.

The Lake Torpedo Company, Bridgeport, Conn., has purchased about 22 acres of property and is reported to have plans under way for a submarine shipbuilding plant, to which it will move from its present leased quarters.

The Hardman Railroad Tie Company, Newport, R. I., has been incorporated with a capital stock of \$25,000 by George H. Hardman, Frank S. Brundage and William H. Brown, all of Fall River, Mass., where it will establish a plant for the manufacture of railroad ties.

The W. H. McElwain Company, Boston, Mass., shoe manufacturer, has started the construction of a power plant in South Manchester, N. H., of 1600 hp. capacity, to cost about \$150,000.

Baltimore

BALTIMORE, Md., Aug. 9, 1915.

The Bartlett-Hayward Company, Scott and McHenry Streets, Baltimore, has taken over a large tract near Dundalk, Md., upon which it will erect a plant, including storage and shipping houses. It is rumored that the shrapnel shells which will be turned out by the plant in the city will be loaded at this place. Large contracts for building materials for the buildings and residences of the employees, have been let. Work on the new plant in the city is progressing rapidly. The order received is said to amount to \$12,000,000 and it may be doubled.

Many Baltimore firms are considering the manufacture of war munitions and all of them are watching the Bartlett-Hayward Company with a great deal of interest. Although many shops which have not taken up this work are thinking of taking this step none of them has made definite announcement as yet.

The addition to the plant of the Baltimore Car & Foundry Company at Curtis Bay, Md., will cover space now occupied by more than one-half of the present structures. It is to be of steel, four stories, 273 x 1200 ft., and will contain more than nine acres of floor space.

Many additions and improvements are planned by the Baltimore Drydocks & Shipbuilding Company, Baltimore, of which Holden A. Evans is vice-president and general manager. Although nothing definite has been decided upon the cost of the improvements will probably amount to \$100,000. They will include two slips for the construction of 350-ft. vessels, cranes and other machinery. A building, 60 x 222 ft.,

will be added and equipped with all the latest shipbuilding machinery. Recently it received contracts for the construction of two triple-screw oil tank vessels, 293 ft. long. Christopher Hannebig, Christiana, Norway. They are to cost approximately \$500,000.

Philadelphia

PHILADELPHIA, Pa., Aug. 9, 1915.

The Baldwin Locomotive Works has started the construction of another addition to its plant at Eddystone. It will be 750 ft. long, of concrete construction. Four piers will be constructed to increase its transportation facilities. It is reported that the new plant of the Remington Arms Company is being rushed to completion. The installation of machinery will begin within the next few days. Much of it has arrived.

It is stated that the Keystone Steel Casting Company, Chester, Pa., will install additional machinery for the manufacture of small castings. It is planned to have the plant in operation by Oct. 1.

The Pennsylvania Vitrified Brick Company, 601 First Building, Philadelphia, Pa., will build a plant at New Hope, Pa., of steel and concrete, to have a capacity of 50,000 bricks or 125,000 sewer bricks per day. The equipment will be electrically operated. Samuel G. Davis will be plant superintendent. Charles H. Beatty, at the head office, is present in charge.

It is reported that the Lee Tire & Rubber Company, Shohocken, Pa., has been given an order by the Max Auto Company for \$48,000 worth of automobile tires. The plant is at present working overtime on rush orders.

Plans are being drawn for a two-story brick ice-making plant, 100 ft. square, to be erected at Ninth and Market Streets, for the Perkiomen Ice & Coal Company, 438 Thompson Street, Philadelphia. Arthur H. Haigh, Raymond Building, is the architect.

W. O. Springle, 1624 Latimer Street, Philadelphia, has been awarded contract for a one-story brick addition, 40 ft., to the boilerhouse of F. W. Funnell & Co., to cost about \$900.

The Colebrookdale Iron Company, Pottstown, Pa., suffered a loss of about \$3,000 by damage from the recent storm.

The L. H. Gilmer Company, manufacturer of belts, etc., North Seventh Street, Philadelphia, Pa., has purchased acres of land at Keystone and Cottman Streets, Tacoma, is having plans drawn for several factory buildings to be completed next fall. It will also move its offices to a new location. Bart Tourison, Land Title Building, Philadelphia, is the architect.

William Shimer, Sons & Co., Freemansburg, Pa., was correctly reported in THE IRON AGE as a manufacturer of wood-working machinery. The company manufactures hardware and iron toys and will not be able to resume operations in their foundry recently destroyed by fire before the spring.

Lebanon, Pa., will receive bids until 5 p. m., Aug. 18, for the construction of a complete sewage disposal plant. T. Crowell is city engineer.

Chicago

CHICAGO, Ill., Aug. 9, 1915.

Evidence of the remarkable demand for second-hand machinery may be had from the exceptional experience of E. L. Essley Machinery Company, which within one week of purchasing the plant of the Wisconsin Engine Company at Corliss, Wis., had disposed of the entire equipment. The demand for tools for manufacturing war materials is the dominating feature of the market, and the call for second-hand lathes and milling machines is especially prominent. One of the machinery dealers has resorted to letting of contracts for the building of tools to manufacturers not ordinarily in the machine tool line, as it has been found impossible to secure adequate supplies of machinery through usual channels. Less inquiry for new equipment is noted from those who have lately taken ammunition contracts than was the case in the earlier stages of this activity. Apparently it has been found possible to adapt present equipment for much of the work, as a better acquaintance with its requirements is had.

The Van Doren Mfg. Company, Chicago, with factories at Chicago and Chicago Heights, Ill., has been taken over by the American Axe & Tool Company, Glassport, Pa. The combined organization will continue the manufacture of axes, hatchets, hammers and similar tools.

The Western Valve Company, Chicago, has been incorporated with a capital stock of \$50,000, by V. Conine, M. Ashcraft, 108 S. LaSalle Street, and Charles F. Rathbone.

The Klunk Unit Stove Company, Chicago, has been organized to manufacture a collapsible stove by A. J. Klunk, J. Hungerford and A. L. Hoffman, with a capital of \$50,000.

The Western Hoisting & Supply Company will erect a factory and warehouse, 124 x 125 ft., at Fillmore and Kedzie Avenue, Chicago, to cost \$45,000.

R. C. Clark, architect for Armour & Co., is preparing plans for a three-story gymnasium and garage to be erected at the Stock Yards, Chicago, at a cost of \$60,000.

M. R. Moorhouse, 407 City Hall, Chicago, will receive bids Aug. 15 for a 20-ton electric traveling crane, with 5-ton auxiliary hoist for the Mayfair pumping station.

Fire at the plant of the Blake Specialty Company, Moline, Ill., caused a loss of about \$15,000. The core oven room and foundry were burned to the ground. It is announced that the plant will be rebuilt at once.

The Rockford Vitreous Enamel Mfg. Company, Rockford, Ill., has been organized by George D. Roper, William H. Roper and Michael J. Green to manufacture stove parts, enameled metal goods and enamel. It has a capital of \$100,000.

The city of Omaha, Neb., will receive bids until Aug. 13 for the construction of a waterworks and an electric light plant. O. P. Wells is city clerk.

The Interstate Mfg. Company, Oskaloosa, Iowa, although suffered a loss by fire of over \$30,000, has continued its work without interruption and is having plans drawn for a new structure with increased capacity.

The Alton-Johns Smoke Consuming Fuel Economizer Company, Alton, Ill., has been incorporated with a capital stock of \$25,000 by Herman Luer, Eugene Strickland and E. L. Luer and will equip a plant for the manufacture of a patented device.

The Dahl Punctureless Tire Company, 1424 Hennepin Avenue, Minneapolis, Minn., suffered a loss of about \$4,000 in fire that damaged its plant.

The Martin Metal Company, Wichita, Kan., builder of automobile bodies, is planning an addition to its plant.

The American Steel Post Company has purchased property at Fort Worth, Tex., and will build a factory.

Sisset Brothers, Sioux City, Iowa, are preparing plans for erection of a planing mill to replace their present plant.

The Liberty Cartridge Company, Riverside, Iowa, expects to begin operations at its new factory very shortly. Its first output will be confined to shotgun cartridges. Equipment will be installed later for the manufacture of war munitions.

The Kellogg-McKay Company, Minneapolis, Minn., is making plans for the construction of a large addition to its present plant.

Cleveland

CLEVELAND, OHIO, Aug. 10, 1915.

New demand for lathes for making shells is almost untold. The sale of over 500 machines to an Eastern concern, nearly all single purpose lathes for making shells, is reported, and an inquiry from New York for 1000 lathes is being made. The source of this inquiry does not indicate whether the machines are for domestic use or for export. A steady stream of small lot inquiries for lathes continues to come from Canada. The demand for automatic screw machinery is heavy as at any time in the past few months. This is being mostly from domestic sources, foreign inquiries having dried off. Round lots of machinery were purchased last week by several Detroit automobile builders, and considerable machinery was purchased for the plants of the Willys-Overland Company, Toledo, and affiliated interests. Among new projects in manufacturing lines, the Van Dorn & Company, maker of gears, and the Van Dorn Electric Tool Company, Cleveland, announce that they have acquired a new site on which they will erect shortly large adding plants, greatly increasing their capacities.

The Ryeburners Engineering Company, Lorain, Ohio, has been incorporated by Thomas M. Brennan of the Brennan Castings Company, Cleveland, and other Cleveland men, and has acquired the plant in Lorain, Ohio, formerly occupied by the Cleveland Ice Machine & Mfg. Company. It is reported that the company has taken a contract for making lathes. It has placed an order for a round lot of lathes.

The Toledo Machine & Tool Company, Toledo, Ohio, will make further extensions to its plant by the erection of a three-story brick and steel building, 75 x 112 ft., to be used as a drafting room and pattern shop.

The Mohawk Motor Truck Company, Ravenna, Ohio, has been organized with a capital stock of \$25,000 to manufacture motor trucks. H. C. Bradley is president, and E. J. Bradley is secretary.

Announcement is made that the Cleveland Tire & Rubber Company, a new company to be capitalized at \$300,000, will build a two-story brick plant, 50 x 150 ft., in Ashtabula, Ohio, for the manufacture of automobile tires. A. E. Pearse, who is interested in the company, has taken a temporary office at 193 1/2 Main Street, Ashtabula.

The Miller Rubber Company, Akron, Ohio, has taken out permits for a six-story building, 109 x 154 ft., and for a one-story building.

A new tire-making plant will be established in Akron, Ohio, by the Western Tire & Rubber Company. A three-story building, 60 x 150 ft., will be erected and a power plant will be installed.

The Buckeye Engine Company, Salem, Ohio, is reported to have closed a large contract for the manufacture of machine tools.

A plant for the manufacture of artificial ice will be established by a new company in Canton, Ohio. Ice-making machinery for a capacity of 75 tons per day will be required. F. W. Crofoot will be manager.

Proposals for the construction of a sewage treatment plant in Chardon, Ohio, will be received by the village clerk Aug. 19.

The Davis Metallic Rod Packing Company, Chicago Junction, Ohio, has been incorporated with a capital stock of \$25,000 by L. J. Davis, L. M. Griffin and others.

The Bucyrus Mfg. Company, Bucyrus, Ohio, formed with a capital stock of \$60,000 to manufacture specialties, has completed its organization by the election of R. O. Perrott, president; F. L. Hopley, vice-president, and Charles Galling, secretary and treasurer.

The H. L. Hurst Mfg. Company, Canton, Ohio, has increased its capital stock from \$40,000 to \$100,000 to allow the extension of its business to include the manufacture of an overhead irrigating system for truck gardens.

Indianapolis

INDIANAPOLIS, IND., Aug. 9, 1915.

The planing mill of the Hamilton Lumber Company, Indianapolis, Ind., was destroyed by fire with an estimated loss of \$30,000. A great deal of valuable machinery was destroyed.

J. A. Johnson and Charles Jacobs have opened a factory at Fort Wayne, Ind., for the manufacture of an auto-tire-saving jack.

S. A. Hastings, 332 Farmers Bank Building, Indianapolis, Ind., is taking bids on a machine shop, one story, 55 x 98 and 22 x 78 ft., for the T. Madden & Sons Company, lounge manufacturer.

The Superior Machine Tool Company, Kokomo, Ind., is making arrangements to start the manufacture of lathes. The plant will start on a small scale, but if the demand is as heavy as is anticipated more building space will be provided.

The Kokomo Brass Works, Kokomo, Ind., have announced that two additions will be made to their factory, doubling their capacity.

Detroit

DETROIT, MICH., Aug. 9, 1915.

The Consolidated Press & Tool Company, Hastings, Mich., will soon begin the erection of its new factory, to be 150 x 300 ft., four stories, and to cost \$100,000.

The plant of the Consumers' Power Company near Cornum, Mich., was destroyed by fire, entailing a loss of about \$15,000. The building was an old one and was filled with valuable machinery.

The Clipper Belt Lacer Company, Grand Rapids, Mich., will build an addition to its factory, 70 x 70 ft.

The business of the Continental Motor Mfg. Company, Muskegon, Mich., has grown so rapidly that it has been obliged to nearly double its earlier plans for additions to its factory. Two new buildings are now in course of construction and a third one contracted for, while a fourth story is to be added to the test house building.

The Hancock Mfg. Company, Charlotte, Mich., manufacturer of brass valves and grease cups, has completed a brick addition 80 x 160 ft., and plans to enlarge its foundry to about twice its present capacity.

The Vulcanized Products Company, Muskegon, Mich., will erect at once a large addition to its plant.

The former plant of the Briggs Detroit Motor Com-

pany, manufacturer of automobiles, has been sold by the Detroit Trust Company, trustee in bankruptcy, to the Denby Motor Truck Company, and the sale has been confirmed by the federal court. The latter company will move in the near future to its new plant, which is situated on Holbrook Avenue and Grand Trunk Railroad.

The Detroit Battery Company, manufacturer of storage batteries, has increased its capital stock from \$10,000 to \$60,000.

The Michigan Steel Casting Company, Detroit, has increased its capital stock from \$210,000 to \$280,000.

The Standard Tool & Mfg. Company, Detroit, manufacturer of tools and metal specialties, has increased its capital stock from \$20,000 to \$35,000.

The Falcon Motor Truck Company, Detroit, has been incorporated with a capital stock of \$20,000 to manufacture motor trucks. The incorporators are Albert B. Hazzard, Otis B. Mallow and Frank T. Lodge.

The Schlieder Mfg. Company, Detroit, manufacturer of motor valves, is erecting a factory building, 80 x 135 ft., at the corner of East Grand Boulevard and Oakland Avenue.

The A. J. Detloff Company, Detroit, manufacturer of automobile parts, is erecting a three-story addition to its plant. Brass and aluminum foundries are being added.

The Hyatt Roller Bearing Company, Detroit, has let contracts on a three-story factory building at Cass Avenue and West Grand Boulevard.

The Detroit Wire Spring Company, Detroit, is erecting a four-story brick and steel addition to its factory on Russell Street.

The Brass & Aluminum Foundry, Detroit, has filed notice of dissolution.

The M. & S. Gear Company, manufacturer of differential gears, has moved its executive offices, advertising and general sales departments from Kansas City to Detroit and is now located at 1306-42 David Whitney Building. The M. & S. gear is manufactured by the Brown-Lipe-Chapin Company, Syracuse, N. Y.

The Michigan Hearse & Carriage Company, Grand Rapids, Mich., has been reorganized as the Michigan Hearse & Motor Company, with a capital stock of \$150,000, and will build a plant at Cottage Grove Street and Union Avenue, Southeast, for the manufacture of motor-driven hearses and ambulances, as well as horse-driven hearses.

The Consumer's Power Company plant near Corunna, Mich., was destroyed by fire on July 31, entailing a loss of \$15,000. It will be rebuilt.

The Reading Bow Company, Reading, Mich., is contemplating moving its plant to Hillsdale.

The Escanaba Mfg. Company, Escanaba, Mich., will add a toothpick department to its factories.

The Lloyd Mfg. Company, Menominee, Mich., is considering increasing its capital stock to \$500,000 and extending its operations by the erection of a factory for the manufacture of reed and rattan furniture.

The Saginaw Automatic Musical Company has been incorporated at Saginaw, Mich., with a capital stock of \$50,000 to manufacture player-pianos.

The Homer Furnace Company, Homer, Mich., is erecting a warehouse, 60 x 120 ft., and has a new foundry in prospect.

The Hancock Mfg. Company, Charlotte, Mich., manufacturer of automobile sundries, is completing the erection of a brick and steel addition to its plant, 80 x 160 ft., doubling its capacity.

The Von Platen Lumber Company, Iron Mountain, Mich., is building a machine shop, 24 x 66 ft. It has placed an order for a new surfacing machine for its planing mill.

The Chamber of Commerce of Kalamazoo, Mich., expects to land a window sash plant for that city.

The Mutual Electric & Machine Company, West Fort Street and Fourth Avenue, Detroit, Mich., has moved its main office and factory from Wheeling, W. Va., to the above address.

The Republic Motor Truck Company, Alma, Mich., is building plant additions having about 19,000 sq. ft. of floor space, to be used as an assembling department and stockroom and to be equipped with cranes and machinery to give a capacity of about 25 to 30 trucks a day.

The Reo Motor Car Company, Lansing, Mich., has started work on additions to be built on three sides of its present plant.

The Campbell, Wyant & Cannon Foundry Company, Muskegon, Mich., manufacturer of engines, castings, etc., has purchased a site in Muskegon Heights for an addition to its plant, 75 x 175 ft., of brick and concrete.

Milwaukee

MILWAUKEE, WIS., Aug. 9, 1916.

Almost every day furnishes new evidence of a continuance of the revival in business. Other lines of the metal trades industry besides machine-tool builders are coming to the front, and even structural steel shops are now able to report improvement. Skilled labor is unobtainable. Outside shops, notably those in the motor car allied industries, are clamoring for men in Milwaukee, where the available labor is quickly taken as soon as presented. For the first time in many months talk is heard of industries forming and establishing. Part of the gain may be attributed to war orders, but the basis is found in large domestic demand. Agricultural implement and gas engine shops continue to operate at capacity and some over time.

W. J. Laughlin, Beloit, Wis., has established a small shop for the manufacture of an automatic steering device for Ford cars. It is constructed of malleable iron.

The Durand Light & Power Company, Durand, Wis., has increased its capital stock from \$35,000 to \$70,000 to provide for extensions and improvements. H. A. Miles is manager.

The Turbo Motor Devices Company, Milwaukee, has been organized with \$30,000 capital stock by Thomas Spence, M. L. Fykse, William G. Spence and L. M. Smith to manufacture carbureters and other automobile and gas engine appliances. Thomas Spence is president and W. G. Spence is vice-president of the Rundle-Spence Mfg. Company, Milwaukee, manufacturer of plumbers' and steamfitters' supplies, etc.

The Prescott Company, Menominee, Mich., manufacturer of sawmill machinery, is establishing a department for the manufacture of steam pumps. Fred M. Prescott, former president of the Fred M. Prescott Steam Pump Company, Milwaukee, became active manager of the Prescott Company about a year ago, after disposing of his Milwaukee interest to the International Steam Pump Company. No new equipment will be purchased at this time.

Articles of incorporation have been filed by the Pepin Electric Company, Pepin, Wis. The capital stock is \$10,000 and the incorporators are C. J. Thies, C. E. Jackson and C. Johnson.

The Union Transfer & Storage Company, Madison, Wis., has awarded the contract for the erection of a six-story reinforced concrete cold-storage warehouse and general storage building to the N. C. Brede Company, Chicago. It will cost about \$125,000 and contain a complete refrigeration unit and distributing system.

The Gisholt Machine Company, Madison, Wis., has awarded the general contract for the erection of its machine shop and warehouse to the Worden-Allen Company, Milwaukee. The contract was placed with the Worden-Allen office at 208 South LaSalle Street, Chicago. It will be 112 x 175 ft., one-story, and the shed, 45 x 112 ft.

The Waukesha Malleable Iron Company, Waukesha, Wis., has resumed operations after the usual fortnight summer interval for overhauling. The foundry is employing 240 men and operating at full capacity.

C. W. Newcombe, president Vincent Valve Company, Tacoma, Wash., is spending some time in Milwaukee with a view to contracting with local machine shops for the production of patented engine appliances, including 10,000 multiple automatic engine drains.

Paul Reiche, formerly city engineer of Wausau, Wis., is organizing a corporation to be styled the Marion Electric Company, with \$10,000 capital, to manufacture electric appliances, motors, etc.

The American Metal Products Company, Thirtieth Street and Lisbon Avenue, Milwaukee, has increased its capital stock from \$25,000 to \$100,000 and is adding a new branch to its line of products.

Cincinnati

CINCINNATI, OHIO, Aug. 9, 1916.

A local automobile manufacturer is making preparations to begin the manufacture of lathes. It is also reported that several other factory operators have had propositions submitted them for finishing lathe parts. While the foreign inquiry for lathes seems to have eased up a trifle lately, it is doubtless due to the inability of machine tool builders to promise anything like an early delivery. A nearby lathe builder reports sufficient orders in hand to keep his plant operating at full capacity up to March 1, 1917. Others, however, are not sold up that far ahead. A few orders for shaping machines have been placed lately, but as this particular branch of the trade depends largely on the domestic demand, no marked improvement is anticipated at an early date.

with milling and radial drilling machines continue good, but are not such urgent demand as lathes. The demand for electrical drilling machines continues very good, but domestic business is rather slow, as manufacturers are turning their energies in getting deliveries of larger machines. All auto truck builders in this territory are very busy on both foreign and domestic orders.

Reports as to the receipt of additional shrapnel orders by machine firms are corroborated to an extent by an inquiry made by a firm at Dayton, Ohio, for approximately 12,000 lbs. of round steel bars. It is also reported that additional orders were placed with plants at Hamilton, Ohio.

The George Butler Bearing Company, Winton Place, Cincinnati, whose plans were recently mentioned, is moving equipment into the vacant plant of the Ideal Steel Wheel Company.

The George W. Schutte Furniture Company, Cincinnati, has acquired an additional site adjoining its plant and will increase its capacity at an early date.

The Edwards Mfg. Company, Cincinnati, is making a shipment of 150 specially designed steel trucks to be used in handling freight at the Panama Canal terminals.

The Consolidated Mfg. Company, Dayton, Ohio, recently incorporated with \$200,000 capital stock, has purchased the plant of the New Era Engine Company, on Dale Avenue, and will fit it up as a machine shop. C. A. Craig is one of the incorporators.

C. C. Wilson, Dayton, Ohio, has commenced work on a plant in South Dayton, to be used for the manufacture of gasoline farm tractors.

The Atlas Portland Cement Company, New York, has secured the right-of-way for a branch railroad to its lately acquired site near Dayton, Ohio, on which it intends to erect a large cement plant. It is reported that building operations will commence at an early date.

Machinery is being installed in the new plant of the Star Metal Products Company, Columbus, Ohio, and the story will be in operation at an early date.

The Capital City Laundry Company, Columbus, Ohio, expects to spend \$25,000 for equipment in a new building.

The D. L. Auld Company, Columbus, Ohio, manufacturing boiler, has let contract for a two-story addition to its plant in which special equipment will be required.

R. H. Evans & Co., Columbus, Ohio, general contractors, have removed their offices to suite 1005-1009 Columbus Kings & Trust Building.

New boilers will be required by the City of Troy, Ohio, for installation in its lighting plant.

C. T. Houghton & Co., Detroit, Mich., manufacturers of workmen's canvas gloves and other specialties, will establish a branch plant at Columbus, Ohio.

The plant of the Robbins & Meyers Company, Springfield, Ohio, was slightly damaged by fire July 23. No delays in making shipments was experienced.

The Steel Grave Vault Company, Orville, Ohio, will put a plant for the manufacture of metallic caskets. D. C. Boyd is president.

The Central South

LOUISVILLE, KY., Aug. 9, 1915.

Business is satisfactory at present in regard to volume, but manufacturers continue to complain of low prices. This applies especially to the boiler trade, some of the builders meeting that contracts are going at figures which cannot possibly allow the makers a profit. Nevertheless, inquiries are so numerous, and the amount of business being placed so large, that it is believed that the necessity of cutting prices to get trade has about passed, and it is hoped that normal quotations will be resumed hereafter. A good many local concerns have been busy on special machinery lately, and jobbing work of all kinds is active. The demand for electrical power equipment is picking up somewhat, though this line inquiries are hardly as numerous as for steam power machinery. Machine tools continue active.

The W. L. Martin Broom Mfg. Company, Louisville, is now buying machinery for its factory.

The Medanich Motors Company, Louisville, is planning the manufacture of an automobile motor of a new type. The Model-Kappa Company is doing the machine work for the present.

The Hiro Mfg. Company, Louisville, has been incorporated with \$200,000 capital stock for the manufacture of automobile specialties. S. E. Barnwell and H. T. Gratz are the principal stockholders.

The board of park commissioners will receive bids shortly for an automatic centrifugal pump, with motor, for use in

connection with the drainage of an underpass. Harry S. Smith is business director.

George T. Thompson, Georgetown, Ky., who has purchased the Crown Flour Mill, Warsaw, Ky., will remodel it and install additional machinery.

The Kentucky Solvay Coke Company, which as recently reported will double the capacity of its plant at Ashland, Ky., will expend about \$700,000 in this work, for which W. H. Blauvelt, Syracuse, N. Y., is consulting engineer. Fifty-four additional ovens will be installed. They are to be the Semet-Solvay horizontal flue regenerator type, with a capacity of 20 tons a day each.

Dickinson Bros., Glasgow, Ky., have let a contract for the erection of an automobile garage and will shortly begin the purchase of equipment.

The Dawson Light & Power Company, Dawson Springs, Ky., has been incorporated with \$7,500 capital stock by James Clark, Jr., Walter S. Clark and Brent Hart. The first named are connected with the James Clark, Jr., Electric Company, Louisville.

The new power plant of the Kentucky River Power Company at Hazard, Ky., will be equipped with condensers, automatic stokers, ash-handling machinery, etc. Edward O'Toole and Howard N. Eavenson, both of the United States Coal & Coke Company, Gary, W. Va., are promoting the proposition.

The Foreman Automobile Company, Paducah, Ky., has started work on a garage to cost \$35,000. Some machinery will be needed.

John Wade & Sons, Memphis, Tenn., have let a building contract for a flourmill to cost \$75,000. Machinery for the manufacture of 500 bbl. of flour a day will be installed.

The Union Iron Company, 135 Ninth Avenue, Nashville, Tenn., is considering the establishment of a plant for the manufacture of a heating device. G. B. Chapman is assistant secretary.

The Clinchfield Products Company, Johnson City, Tenn., is reported to have plans for the erection of a plant costing \$500,000 for the manufacture of chemical products from feldspar. Three large buildings are to be erected. Henry A. Kaufman is superintendent.

The Elk Cotton Mills, Fayetteville, Tenn., will probably install a low pressure steam turbine. J. E. Serrine, Greenville, S. C., is the engineer in charge.

The sporting goods factory of John V. Wright, Bolivar, Tenn., which was burned last week with a loss of \$5,000, will be rebuilt at once.

Birmingham

BIRMINGHAM, ALA., Aug. 9, 1915.

Machinery dealers report better conditions than have existed for a year, with an all-round demand for practically all manner of machinery and equipment. The volume of business is equal to that of the same period last year, prior to the war. A great deal of changing from steam to electricity in shop, mill and mine is in progress in Alabama, southern Tennessee and Georgia, resulting in a steady demand for all sorts of electrical equipment. The call for engines, both steam and gasoline, pumps, motors and machine tools is improving. The sawmill trade has reappeared in the machinery market and is making liberal purchases. The last vestiges of depression have gone and the upgrade is on.

The Alabama Power Company, Birmingham, has obtained electric lighting franchises in the towns of Guntersville, Jacksonville and West Blockton, Ala.

Roberts & Wilkes, Macon, Ga., will build a waterworks plant for the town of Ashland, Ala., at a cost of \$12,500.

George W. Hart, Helen, Ga., will install machinery for the manufacture of spokes, handles, etc.

W. L. Gwaltney and E. L. Myer have incorporated the Imperial Mfg. Company, Atlanta, Ga., with a capital stock of \$20,000 to manufacture chemical compounds, etc.

The Black River Cypress Lumber Company, Sardinia, S. C., has been incorporated with a capital stock of \$250,000 by C. P. Goble, H. W. Hewes, A. C. Gearheard and L. W. Gilbert, to develop timber properties.

The Aluminum Company of America, Marysville, Tenn., is reported as having signed an agreement with the Southern Railway, permitting construction of its proposed seven power dams on Little Tennessee River. A development of 400,000 hp. is planned.

The Central Warehouse & Gin Company, Dothan, Ala., has been organized with a capital stock of \$75,000 by J. R. Young, John Sanders and others to build a ginny and warehouse.

The Southern Cotton Oil Company, Augusta, Ga., will install electrically-driven machinery.

Texas

AUSTIN, TEX., Aug. 7, 1915.

One of the features of the machinery trade is the increase in the demand for electrical equipment for lighting and power plants all over the State. The small tool trade is also very active at this time. The opening of the cotton season promises to cause a general revival of business, the more so if good prices are obtained for the product.

The Deltex Spring Bed Company, Dallas, has been organized with a capital stock of \$20,000 to manufacture bed springs. H. L. Marshall is in charge.

The electric light and power plant, near Carlsbad, N. M., which is serving the United States Government reclamation project and that town is to be equipped with additional machinery.

The plant of the San Angelo Water, Light & Power Company, San Angelo, is to be equipped with additional machinery and other improvements made at a total cost of about \$50,000.

The Green Marble Company, San Saba, has been organized with a capital stock of \$100,000 to operate marble quarries. C. R. Green is in charge.

The Fort Bliss military post is to be equipped with a new pumping plant to cost about \$45,000, according to recommendations of Captain R. C. Marshall, Jr., of the Quartermaster General's office, War Department, Washington.

The lumber and planing mill of the Lutch & Moore Lumber Company, Orange, which was recently destroyed by fire with a loss of \$150,000, will be rebuilt.

St. Louis

ST. LOUIS, MO., Aug. 9, 1915.

Inquiry for machine tools is still showing a slow but steady increase, and while lists are not coming out for large quantities, the demand for single tools persists. The transactions closed and the inquiries out are broadly general in their character, both as to the types of machines wanted and area of territory from which they come. Reports of improving business conditions continue to come from all quarters.

The city of St. Louis, Mo., will reconstruct an 85,000,000-gal. reservoir and will require considerable mechanical equipment, gate valves, etc. About \$410,000 will be expended. E. E. Wall is water commissioner.

The Standard Oil Company has purchased the plant of the Kansas City Billiard Table Company at Kansas City, Mo., and will move its headquarters from Armourdale there. No announcement has been made as to improvements which may be made in the property.

The combined electric light plant and ice factory at Blue Springs, Mo., belonging to J. C. Waugh, Kansas City, burned, with an estimated loss of \$5,000. Mr. Waugh has announced that he will rebuild.

The repair shops of the Atchison, Topeka & Santa Fe Railroad at Argentine, Mo., which were destroyed by fire with an estimated loss of \$100,000, will be rebuilt at once.

The Gravois Foundry & Mfg. Company, St. Louis, Mo., recently incorporated, has bought property on Thirty-eighth Street and will begin at once the erection of a foundry and machine shop.

The Hesse Carriage Company, Kansas City, Mo., is building a two-story addition, 83 ft. long, two stories, to cost about \$25,000.

The Quaddy Playthings Mfg. Company, Kansas City, Mo., has been incorporated with a capital stock of \$50,000 by Henry Sieben, Arthur C. Brown and B. R. Clarke, and will equip a wood-working plant.

The Johnson County Light & Power Company, Knobnoster, Mo., has been incorporated with a capital stock of \$15,000 by S. A. Kelley, Guy C. Cooley and James Ennis.

The Des Moines Saw Mill Company, Des Moines, Iowa, will equip a sawmill at or near Springfield, Mo., for the manufacture of gunstocks.

Poplar Bluff, Mo., will expend about \$20,000 on sewage system equipment, including duplex ejector equipment, etc.

The Lasswell Lumber Company's planing mill, Kennett, Mo., which has been burned with a loss on machinery of about \$30,000, will be replaced at once.

A cotton gin of about 100 bales daily capacity will be installed at Blytheville, Ark., by Joseph Meyer; also a sawmill plant and power equipment.

The G. H. Jones Lumber Company, Snyder, Ark., will equip a large shoo manufacturing plant at Hamburg, Ark. New machinery is wanted.

The Walbert Stave Company, Peach Orchard, Ark., has

bought the Mendenhall plant and will add considerable equipment. T. J. Walbert, Batesville, Ark., is president.

The National Refrigerator & Fixture Company, Texarkana, Ark., has been incorporated with a capital stock of \$100,000 by Moritz Reinoldt, Robert R. Cough, James Barrett and Jones P. Jones and will equip a manufacturing plant.

The Latimer Construction Company, Tulsa, Okla., is in the market for equipment for one 110-volt, 25-kw. battery reserve electric lighting plant.

The Board of Trustees, Caddo, Okla., of which S. Powell is president, is in the market for two oil engines, two triplex pumps, two centrifugal pumps, filter equipment, etc. J. E. Davis is city engineer.

The Gold Tank Company, Okmulgee, Okla., has been incorporated with a capital stock of \$15,000 by I. N. Gold, J. T. King and G. W. Harris and will equip for the manufacture of tanks and other iron and steel work.

The Pemeta Rock Company, Pemeta, Okla., with offices at the Majestic Building, Oklahoma City, Okla., will install a crusher plant, to cost about \$25,000. W. R. Crusoe is president.

The Central States Construction Company, Oklahoma City, Okla., has been incorporated with a capital stock of \$100,000 by John R. Hose, J. R. Eldridge and G. C. Jones and is reported in the market for general contracting equipment.

The American Glass Casket Company, 100½ North Broadway, Oklahoma City, Okla., will require machinery to cost about \$50,000 for its initial output of 500 caskets daily. T. C. Hamilton, Hamilton, Okla., is vice-president.

The assembling plant to be equipped at Oklahoma City, Okla., by the Ford Motor Company, Detroit, Mich., will require about \$65,000 of equipment. A site has been acquired and construction will begin soon.

The Automobile Sales Company, Tulsa, Okla., Nebraska Building, will install about \$5,000 worth of machinery. E. D. Mitchell is the proprietor.

The city of Lehigh, Okla., will install oil engines, duplex pumps, etc., with a daily capacity of 1,000,000 gal. in connection with its new waterworks plant.

The J. J. Newman Lumber Company, Sumrall, Miss., will rebuild and re-equip its mill, No. 2, machine shop, dry kiln, etc., recently burned with a loss of \$200,000.

The Southern Cooperage Company, New Orleans, La., will build a new cooperage plant of undetermined capacity.

The Merchants' Furniture Mfg. Company, New Orleans, La., will equip a wood-working plant. F. W. Kallenberg is a prominent stockholder.

The Grant Timber & Mfg. Company, Selma, La., has bought about \$500,000 worth of timber land at Colfax, La., and will install mill equipment.

The American Fish Company, New Orleans, La., will expend about \$30,000 on equipment for its refrigerating and cold storage plant. D. C. O'Malley is president.

J. G. Michie and L. W. Calvert, Lake Charles, La., are in the market for a 5-ton refrigerating and ice-making plant.

The Federal Oil & Refining Company, Alexandria, La., has been organized with a capital stock of \$150,000 by W. W. Whittington, president, and others, and will equip a refinery of 1000 bbl. daily capacity in 250-bbl. units.

The Standard Oil Company of Louisiana will equip a pipeline together with pumping stations from Baton Rouge to the oil fields of Texas.

The City of New Orleans, La., will equip an electric light plant for special isolated purposes. W. J. Hardee, city engineer.

The New Orleans Silica Bricks Company, New Orleans, La., has been incorporated with a capital stock of \$100,000 by James H. Dyett, Frank Bowers, Lionel M. Ricau, and others, and will equip a plant with a daily capacity of 75,000 sand lime bricks.

San Francisco

SAN FRANCISCO, CALIF., Aug. 3, 1915.

Business appears to be picking up a little. Nothing of great importance is in sight; but garage orders are fairly numerous and a few single tools are going out. Many small inquiries are also coming from manual training schools. The general advance in prices is undoubtedly causing many prospective purchasers to hold off, as few manufacturers are really in urgent need of equipment. Some foreign inquiry is reported, but very few of the class of tools wanted, it is understood, are carried in stock here. Export trade in other lines is encouraging, as the Orient and Australia are coming into the market for many products formerly secured from Europe, and this is gradually reacting on Pacific Coast industries. A good business in sugar mill and plantation ma-

mining has been in the Hawaiian Islands. Mining machinery continues to move fairly well, and miscellaneous miners' equipment is gradually getting more inquiry.

The Columbia Steel Company, Pittsburg, Cal., manufacturer of steel castings, is preparing to make an addition to its plant to handle small castings, including a new electric furnace and other equipment. D. H. Botchford, the superintendent, is preparing to go east to buy machinery.

The Giant Powder Company's plant, at Giant, Cal., was recently acquired by the Atlas Powder Company, Wilmington, Del., and is to be extensively enlarged. W. J. Webster of the Atlas Company is now in San Francisco to prepare for the improvements.

Norman de Vaux, of the Chevrolet Motor Company, Flint, Mich., has announced that the company will establish an assembling plant in San Francisco.

Owing to the requirements of coming crops and the heavy tourist travel, the Southern Pacific Railroad has increased its forces and hours of work at the Sacramento and Los Angeles shops.

The power and aqueduct officials of Los Angeles have practically completed plans for hydroelectric developments in the Mono district and on streams tributary to Owens Lake, from which the Los Angeles water supply is taken. The city asks twelve years in which to carry out the plans.

The Island Transportation Company, Stockton, Cal., will begin work shortly on a marine ways at Wood Island.

It is reported that the Los Angeles Pressed Brick Company, Los Angeles, will triple the capacity of its branch plant at Richmond, Cal.

The Taft Ice Delivery Company, Taft, Cal., is preparing to install a new 6-ton ice machine.

E. D. McCalry, Auburn, Cal., is preparing to start a planing mill.

The Pacific Northwest

SEATTLE, WASH., Aug. 3, 1915.

With the increased wheat acreage and heavy yield, it is safe to say that Washington farmers will receive larger returns for their crops this year than at any time in the last decade. Fruit growers are making preparations for heavy fruit yields this year, and canning and drying plants are purchasing new equipment. The West Coast Lumbermen's Association reports about 62 per cent of the capacity of 110 mills west of the mountains in this State now in operation, against 40 per cent a few months ago.

The British Admiralty has taken over the drydock at Esquimalt, B. C., for emergency work, and as a result many vessels which formerly were docked there will now be sent to Seattle.

Further evidence of the vast Transpacific freight shipments to be sent to Vladivostok is the chartering by Frank Waterhouse, Inc., Seattle, of seven vessels to carry freight cars there. The shipment covers 7500 cars, of which about 1500 will pass through Seattle. This is only a small part of the large shipments to be sent through this port during the summer and fall. The Great Northern Steamship Company is now loading 200 carloads of rails on the steamship Minnesota to be sent to Russia.

The controlling interest in the Red Mountain Mining Company, Bellingham, Wash., has been purchased by George Woodfield, Reno, Nev. The company will immediately install equipment, including a power plant, drills to be operated by electricity or compressed air, etc.

The Olympic Portland Cement Company, Bellingham, Wash., has announced that operations at its plant will begin at once. It has an output of 1000 bbl. per day, and has been idle since November. A number of improvements and repairs have been made.

The Silver Falls Timber Company, Portland, Ore., has increased its capital stock in the sum of \$400,000, to be used to extend the company's logging roads and make other necessary improvements to its holdings.

Half Way, Ore., has been granted permit for municipal water supply plant costing \$20,000.

The sawmill and lumber yard of Frank Betchart, Roy, Wash., was completely destroyed by fire recently with a loss of more than \$50,000.

Construction work on the plant of the Beaver Portland Cement Company, Portland, Ore., at Gold Hill, Ore., suspended when war began, will be rushed to completion. It represents an investment of \$600,000.

The Markie Mills Company, operating a shingle mill at Gold Basin, near Granite Falls, Wash., plans to install machinery at once for the manufacture of bucket staves.

The Post Lambert Mining Company, Bellingham, Wash., will install a generator at Silesia Creek Falls.

The DuBois Lumber Company, Astoria, Ore., has placed a mortgage of \$1,000,000 on its properties, to provide funds for the construction of railroads and logging camps.

The Lebanon Lumber Company, Lebanon, Ore., has increased its capital stock from \$50,000 to \$250,000, the funds to be used in making extensions and additions to its plant.

The Anthony Creek Lumber Company, White Sulphur Springs, Wash., has been incorporated for \$50,000, and will erect a sawmill.

The Bonner Light & Water Company, Bonners Ferry, Idaho, will install an auxiliary pumping plant, electrically driven.

Canada

TORONTO, ONT., Aug. 9, 1915.

Two new boilers of 300 hp. capacity will be installed in the plant of the Central Heating Company, Berlin, Ont. C. H. Thompson, Toronto, Ont., is a stockholder in the company.

Construction work will be started at once on the erection of a factory on Burlington Street for the Dominion Steel Metal Company, Lister Building, Hamilton, Ont.

Athens, Ont., will build an electric light and power plant and system.

The Maritime Foundry Company, Chatham, N. B., is contemplating the erection of a shell factory to cost \$40,000. Frank McNaught is manager.

S. Anglin & Co., Wellington Street, Kingston, Ont., are building a planing and sawmill to cost \$4,000.

The Makamik Sawmill Company, Makamik, Que., is building a sawmill to cost \$6,000.

A new addition, 70 by 80 ft., will be added to the plant of the Canadian Billings Spencer Company, Welland, Ont.

The Canadian Munitions Corporation, Ltd., Toronto, Ont., has been incorporated with a capital stock of \$500,000 by Edwin A. Hill, 91 Don Roadway; Samuel J. Rutherford, 30 Binscarth Road; George T. Lea, 577 Indian Road, and others of Toronto, to manufacture explosives, munitions, guns, mortars, and machinery for the manufacture of war material.

The Rosetown Electric Light & Power Company, Ltd., Rosetown, Sask., has been incorporated with a capital stock of \$50,000 to erect plants and generate electricity, light, heat, power, etc.

Regina, Sask., will receive bids until Sept. 6 for two turbine pumps of 3,500,000 gal. per day capacity, against a pressure of 60 lb. per sq. in. George Beach is city clerk.

W. A. Dean, Toronto, Ont., will build a factory near Montreal for the manufacture of flying machines, aeroplanes, etc.

The Chesley Chair Company, Ltd., Chesley, Ont., is in the market for an upright boring machine.

The ratepayers of Lennoxville, Que., passed a by-law to purchase the waterworks plant and spend \$14,000 on extensions and repairs.

Carlyle, Sask., will spend \$3,000 to complete its electric light, heat and power plant.

McFee, Henry & McDonald, Ltd., Victoria, B. C., has been incorporated with a capital stock of \$50,000 to manufacture drills, drilling machinery and other implements, etc.

The Cleaning Compound Company, Ltd., Victoria, B. C., with a capital stock of \$50,000 has been incorporated to manufacture cleaning articles, etc.

The Keystone Logging & Mercantile Company, Ltd., Silverdale, B. C., has been incorporated with a capital stock of \$10,000 to manufacture lumber, shingles, etc.

The Burbank Motor Company, Ltd., Kelowna, B. C., has been incorporated with a capital stock of \$15,000 to manufacture automobiles, agricultural implements, etc.

The Crescent Valley Lumber Company, Ltd., Vancouver, B. C., has been incorporated with a capital stock of \$25,000 to manufacture timber, etc.

The R. M. Moore & Co., Ltd., Vancouver, B. C., has been incorporated with a capital stock of \$50,000 by Robert M. Moore and others of Vancouver to manufacture engines, lighting, heating and power machinery, etc.

The Sardis Shingle Company, Ltd., Vancouver, B. C., has been incorporated with a capital stock of \$10,000.

The McLeod Pulp Company's mill at Millerton, N. S., was destroyed by fire with a loss of \$20,000.

The Canadian Metal Cap & Seal Company, Ltd., Montreal, Que., has been incorporated with a capital stock of \$600,000 by L. H. Boyd, A. R. Johnson, A. Ross, and others of Montreal, to manufacture metal goods, caps, iron, steel, etc.

NEW TRADE PUBLICATIONS

Alloy Bronze Castings.—Titanium Alloy Company, Niagara Falls, N. Y. Pamphlet. Describes a number of titanium aluminum standard bronzes that have been developed for use where particular strength or hardness requirements have to be met. Each alloy is given two pages, one containing photomicrographs of the alloy, while a table showing the approximate composition and the physical properties together with a brief statement of the uses to which the alloy may be put, are presented on the facing one. Mention is also made of other special bronzes or bronzes that can be supplied as well as the research work which the company is prepared to undertake in connection with specific problems.

Heat and Hardness Measuring Instruments.—Shore Instrument & Mfg. Company, 555 West Twenty-second Street, New York City. Two pamphlets. One is concerned with the Pyroscope, which is an optical temperature gage for use in the heat treatment of steel. After pointing out the advantages of the sight pyrometer, such as probability and the absence of electrical connections, instructions on operation, maintenance and cleaning are presented. Information on the heat treatment of the various kinds of steel is included and a number of views of the instrument in use are given. The other pamphlet is devoted to the application of the Scleroscope to the various industrial arts. After a brief historical account of the development of the instrument, various conceptions of hardness are touched upon and the advantages of purchasing raw and finished materials to Scleroscope specifications emphasized. The relation of hardness to various other physical properties is taken up and a number of instructions on the heat treatment of different kinds of steel are included. A description of the mechanism and the way in which it operates and data on the relation of the Shore and Brinell scales are included.

Saw Guards.—Lockhart-Hodge Company, Inc., Buffalo, N. Y. Pamphlet. Covers a line of guards for saws and various other woodworking machines. Illustrations of the two types of guards which are made from aluminum with open and closed fronts are presented and the guards briefly described after which their application to different machines is taken up and illustrated. In addition to the guards for saws, guards for jointing, shaping and splitting machines are shown as well as a wire mesh guard for band saws. Mention is also made of special guards that can be furnished for different locations in factories and industrial plants.

Testing Machines.—Tinius Olsen Testing Machine Company, 500 North Twelfth Street, Philadelphia, Pa. Condensed catalog. Gives a brief idea of machines that have been built for universal, spring, cement, cloth, rubber, leather, wire, general, oil, transverse and special testing. The catalog is divided into eight sections, each devoted to some special line, and in these sections views and brief descriptions of the various machines are presented. Mention is made of some exceptionally large machines that have been built, notably one having a capacity of 10,000,000 lb. for the United States Bureau of Standards and a list of users of machines ranging from 600,000 to 1,000,000 lb. in capacity is included.

Depth Measuring Instrument.—Pneumercator Company, 118 Liberty Street, New York City. Pamphlet and circular. The latter relates to the use of the Pneumercator for measuring the depth or head of liquid in automatic sprinkler systems; service, fuel oil or gasoline storage tanks; standpipes, reservoirs, canals, etc. A number of diagrams showing the use of the device are presented. The pamphlet is a reprint of a paper presented before the American Society of Naval Engineers and contains a description of the installation and operation of the device. A number of engravings and diagrams are used to supplement the text.

Recording Instruments.—Industrial Instrument Company, Foxboro, Mass. Bulletin No. 96. Describes briefly a line of instruments for recording pressure, temperature, moisture, speed, time and liquid levels. A separate page is given to each type of instrument, an illustration with brief description and table of various sizes being included. References are made to other bulletins of the company containing complete descriptions of the instruments.

Boiler Tube Cleaners.—Lagonda Mfg. Company, Springfield, Ohio. Catalog No. Z-1. Discusses the formation and removal of scale from fire tube boilers and also describes and illustrates a new type of vibratory cleaner. This loosens the soot on the interior of the tubes and it is blown out by the air or steam exhaust from the front of the turbine. As the name indicates the cleaner operates on the principle of vibration, the vibrating head rotating in the tube and striking every portion of the interior circumference. This vibration loosens and cracks off the scale, although it is pointed out that the blow is not heavy and the tubes are not damaged. Mention is also made of a number of other boiler room specialties, such as automatic lubricators, tube cutting water strainers, etc.

Belt Shifting Device.—Ready Tool Company, Bridgeport, Conn. Folder. Points out the advantages of a new type of belt shifting pole which was illustrated in THE IRON AGE, Feb. 11, 1915. A special feature of the device is the use of three rollers, two of which are tapered to cause the belt to slide on the pulley and the shifter to slide away. A view of the device in use as well as enlarged view of the head are presented.

Internal Combustion Engines.—Charter Gas Engine Company, Sterling, Ill. Catalogs Nos. 12 and 13. The first relates to a line of oil engines which are built in sizes ranging from 20 to 50 hp. The various features of the engines such as economy, accessibility, durability, low cost, etc., are touched upon followed by a description of the construction of the engine which is supplemented by a number of line drawings. One of the special points about the engine is the use of a special type of vaporizer which is relied upon to enable lower grade oil to be employed as fuel. Specifications of the engine are presented and there are a number of views showing it in actual use. The second catalog deals with a line of gas and gasoline engines that are built in five sizes ranging from 8 to 20 hp. in both stationary and portable types. The construction of the engine is gone into at length and instructions on its operation are given. A number of views showing the different types of engines that are built are presented and a number of specification tables are included.

Drag-Line Buckets.—Brown Hoisting Machinery Company, Cleveland, Ohio. Pamphlet. Treats of the Shanks patent drag-line bucket which consists of a shell, a pulling ball and a combination hoisting and back-gate. Among the advantages claimed for the bucket are the handling of lumps of rocks and sticky materials, the elimination of any locking or tripping device on the back gate and ease of repairs. The construction and operation of the bucket is gone into at some length, and the text is supplemented by a number of engravings and diagrams showing the bucket in use. A condensed table of specifications of the various sizes of buckets that are regularly made is included.

Sand Blast Apparatus and Supplies.—Robert MacLe Specialty House, Jersey City, N. J. Catalog No. 5. Shows a line of sand blast apparatus and accessories which include driers, helmets, gloves and respirators. The operation of a sand blast machine is taken up in some detail and the text is supplemented by a number of line drawings showing the construction. Mention is also made of a sand blast tumble barrel and the work which the firm is prepared to do in the fitting of sand blast cleaning rooms to meet the requirements of particular cases.

Protective Metal Seals.—Metropolitan Engineering Company, Forty-second Street Building, New York City. Page 3 of catalog section 6. Describes and illustrates a metal seal which, while designed particularly to guard against interference with electric service apparatus on consumers' premises, can also be used for protecting valves, cocks, instruments, registers, freight cars, etc.

Centrifugal Blowers and Compressors.—De Laval Steam Turbine Company, Trenton, N. J. Catalog P. Describes centrifugal blowers and compressors for all pressures from 5 in. of water up to 125 lb. per square inch. The development of this blower enables it to be used in all fields from mechanical draft service up to the distribution of compressed air in mines, machine shops, shipyards, etc. A number of charts showing curves for isothermal, adiabatic and actual compression of air and also the theoretical power required to compress air and the characteristics of single and multi-stage blowers and compressors are presented and the influence of impeller design upon the form of the characteristics is discussed at some length. The application of blowers and compressors to forced draft, coal gas manufacture, coke oven and water gas plants, sugar and blast furnace work, Bessemer converters, supplying compressed air in mines, shipyards, etc., are gone into at some length and the illustrations show numerous examples of blowers and compressors directly connected to steam turbines or electric motors, a peripheral velocity of 450 to 600 ft. per second, being possible with this type.

Spot Welding Machines.—Agnew Electric Welder Company, Detroit, Mich. Collection of circulars. Call attention to a line of spot and butt electric welding machines which were illustrated in THE IRON AGE, April 8, 1915. Each of the circulars is identical in make-up, an engraving of a particular machine being presented with a condensed specification table and brief description of the essential features.

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